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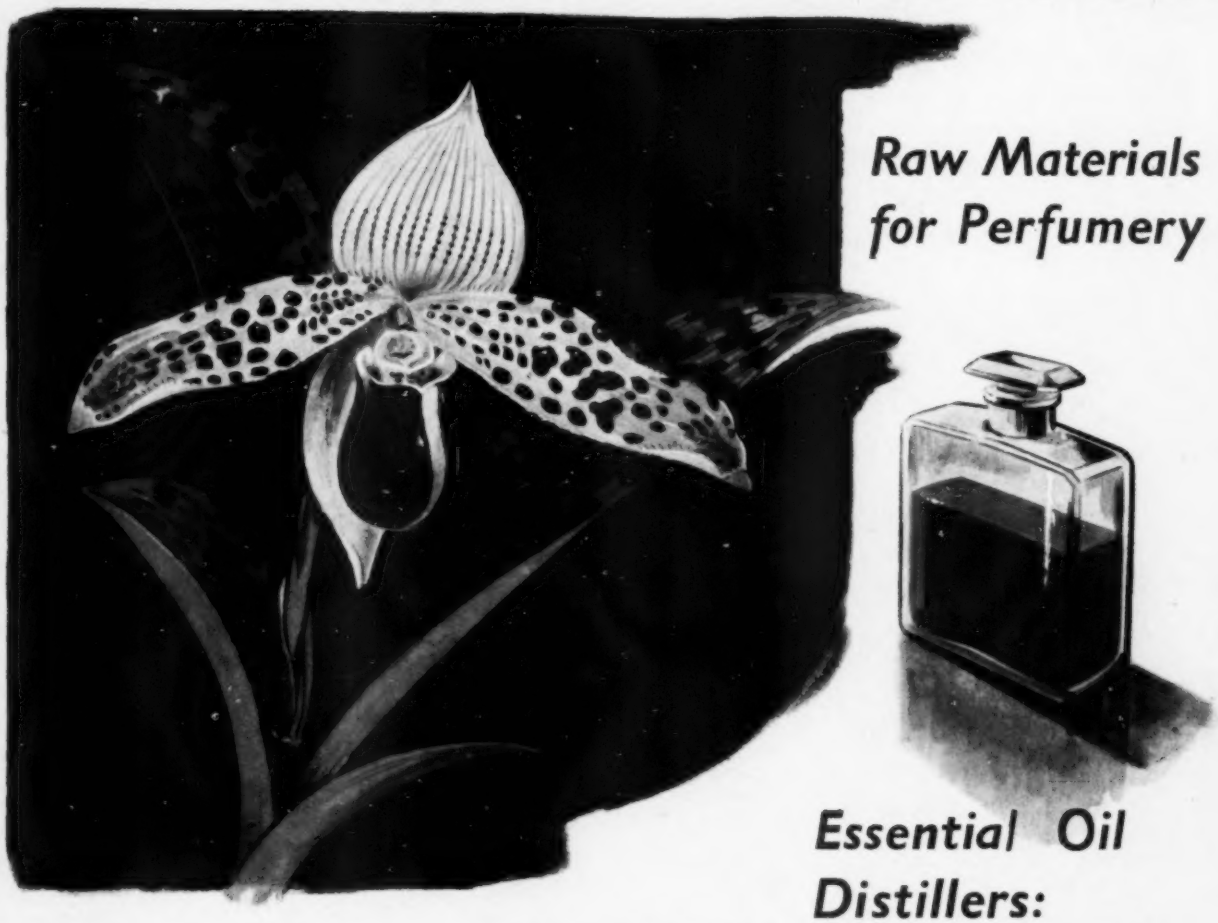

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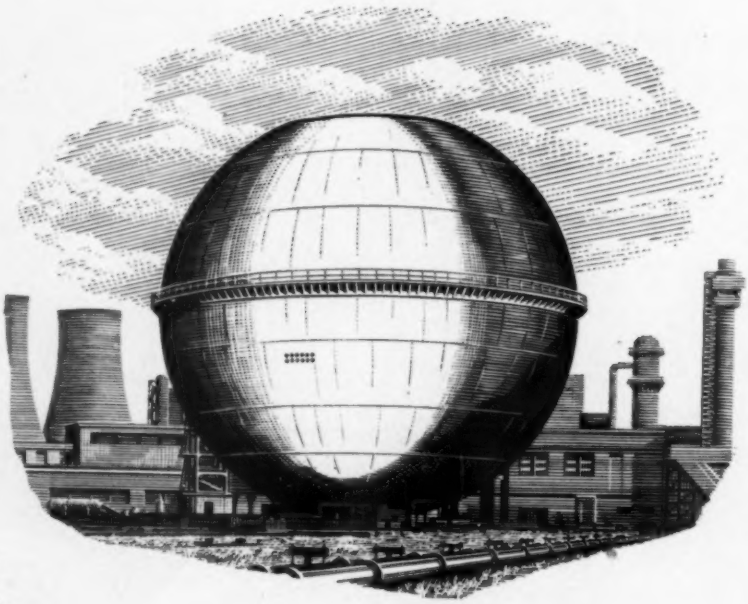

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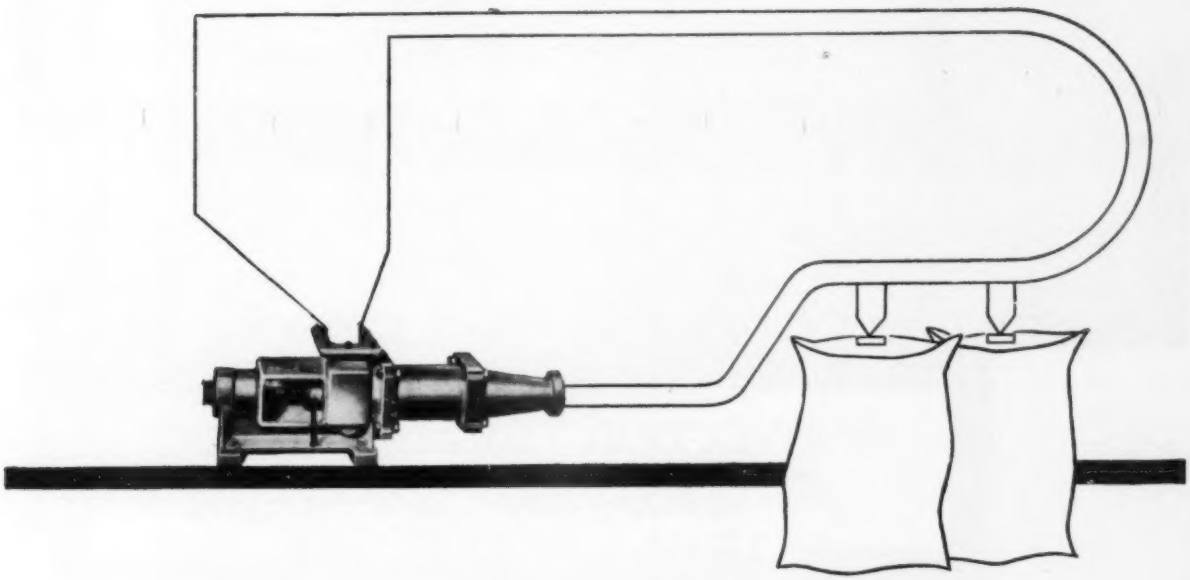

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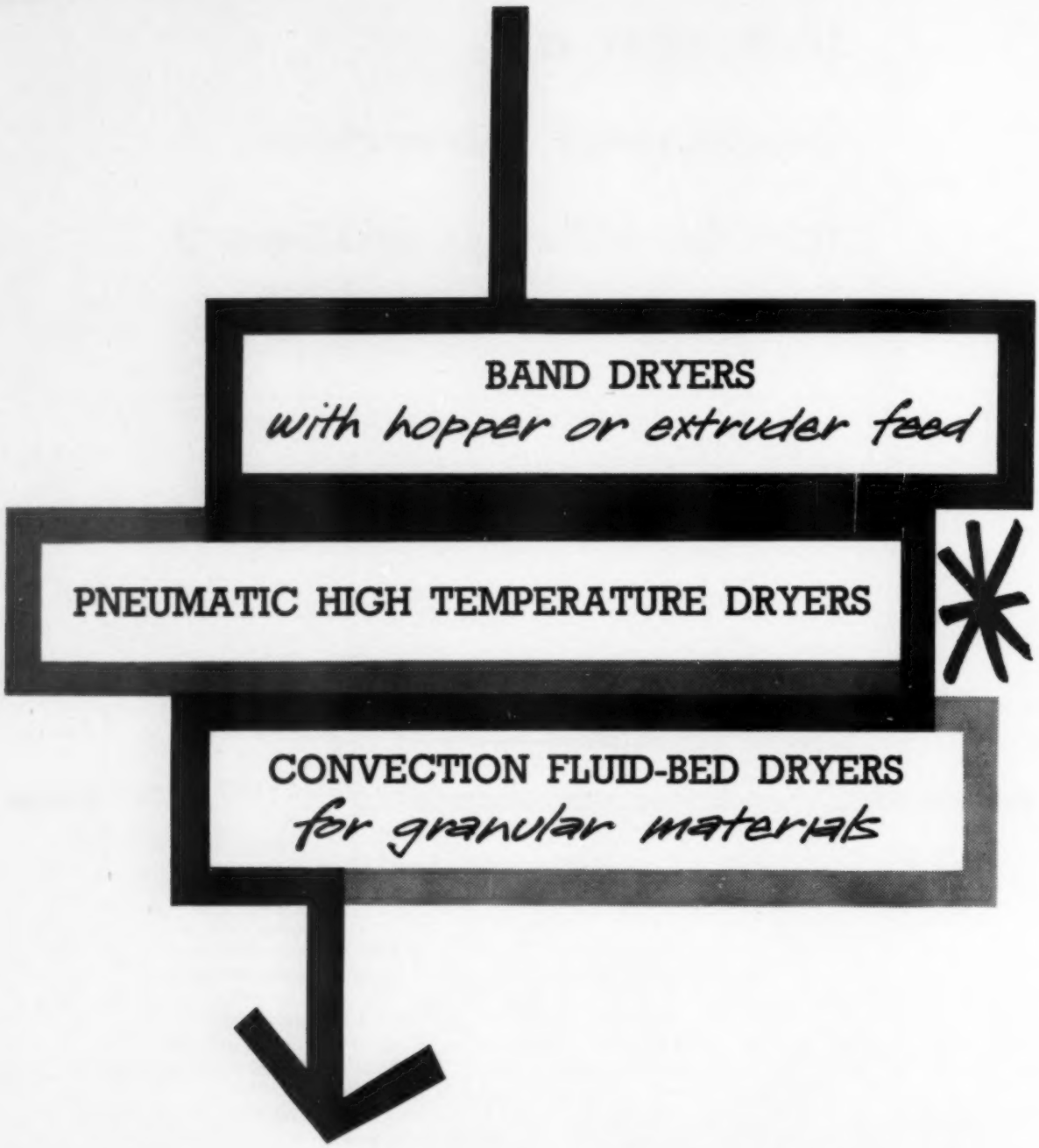

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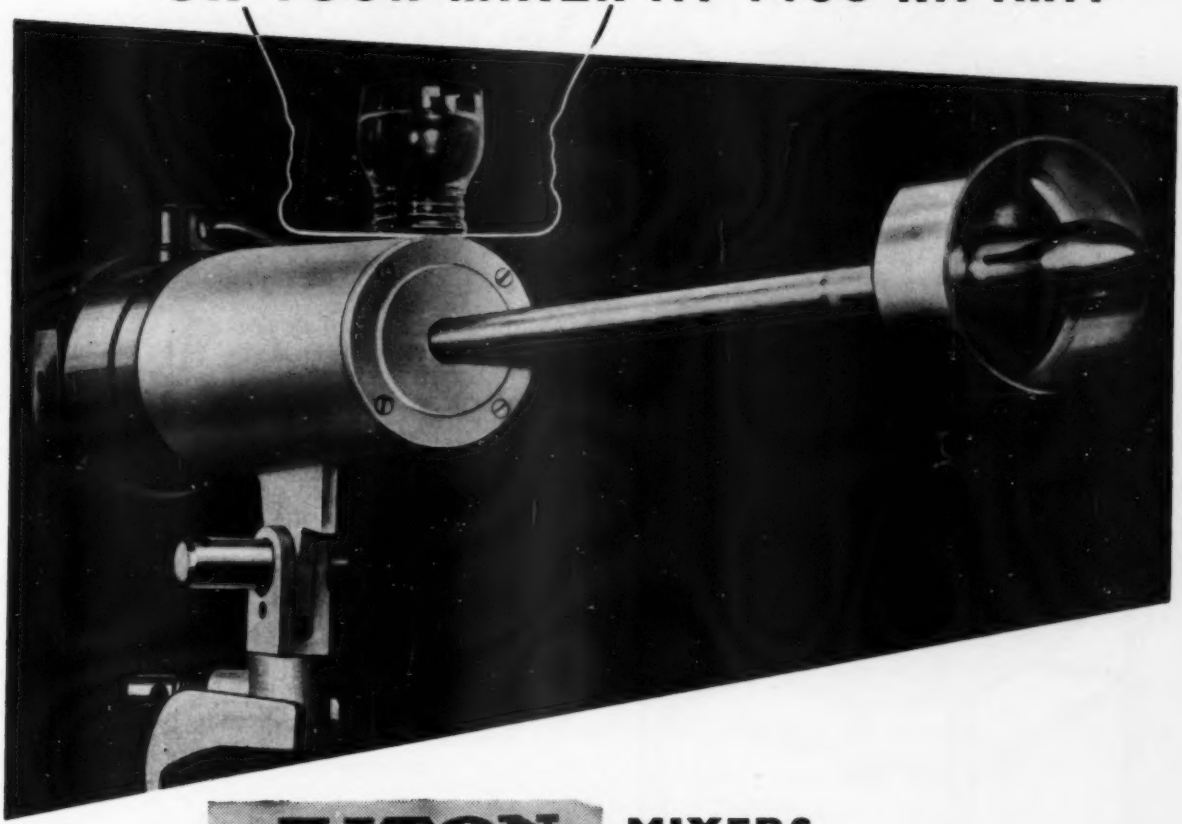

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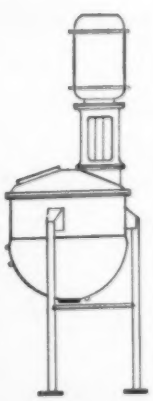

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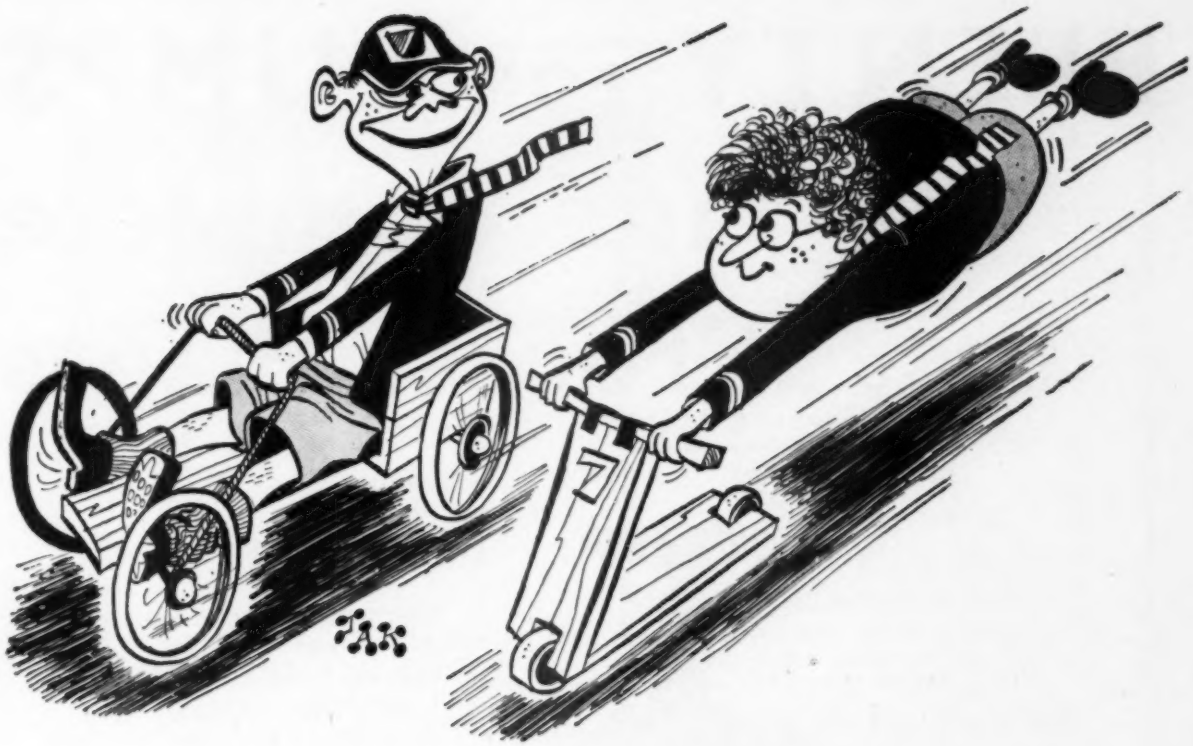

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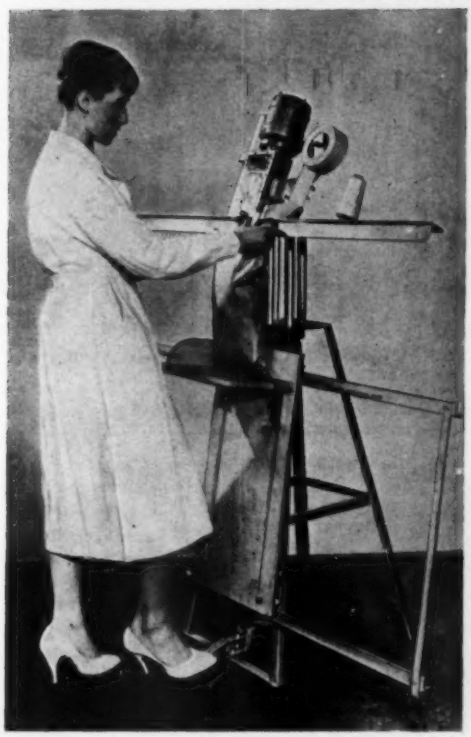

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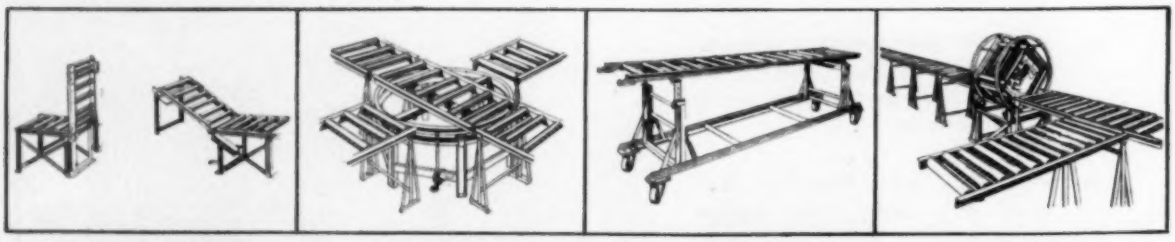

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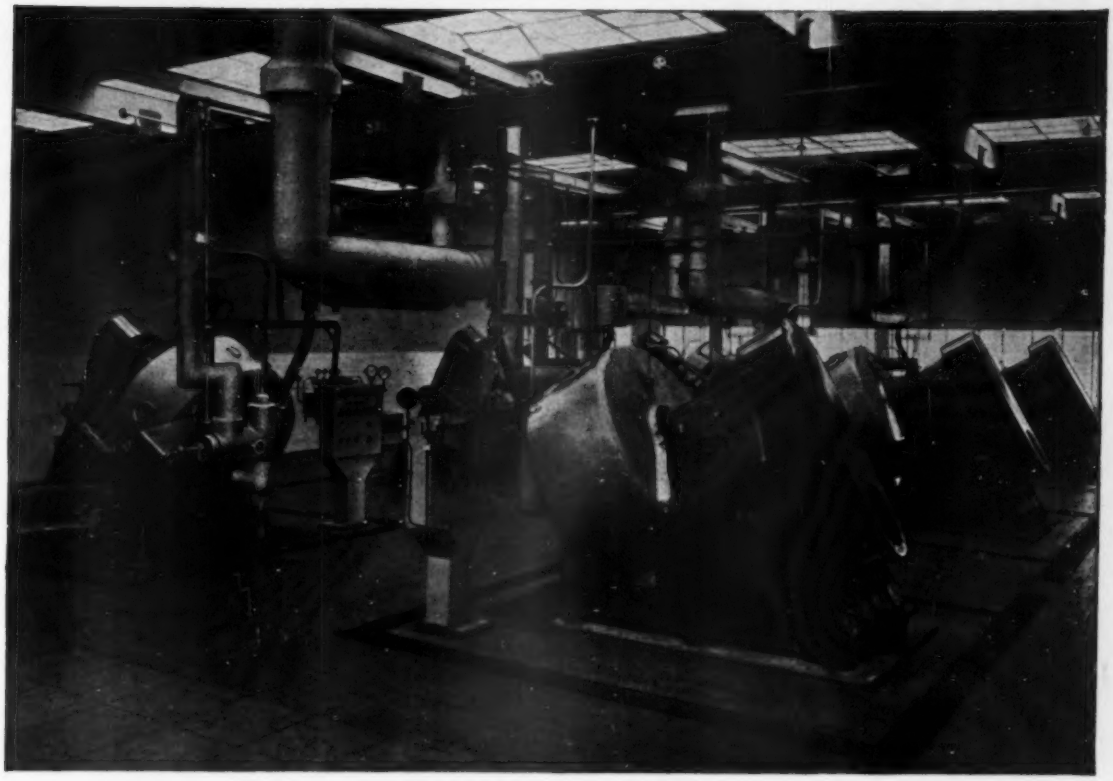

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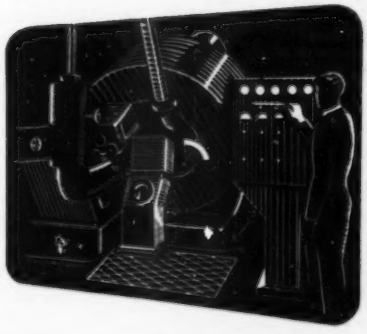

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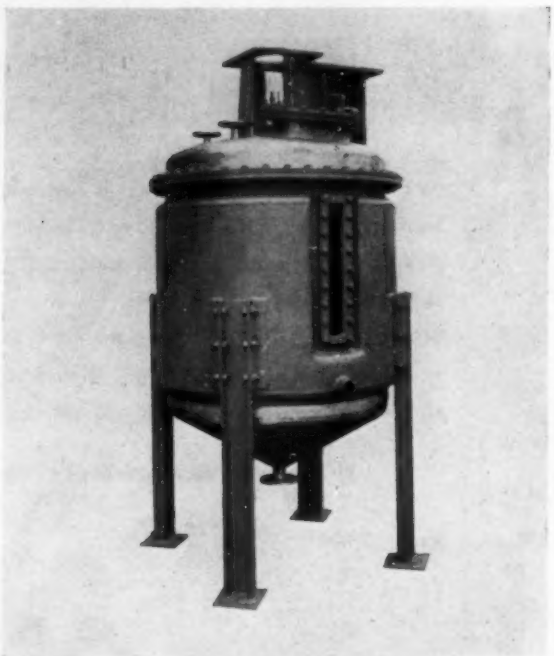

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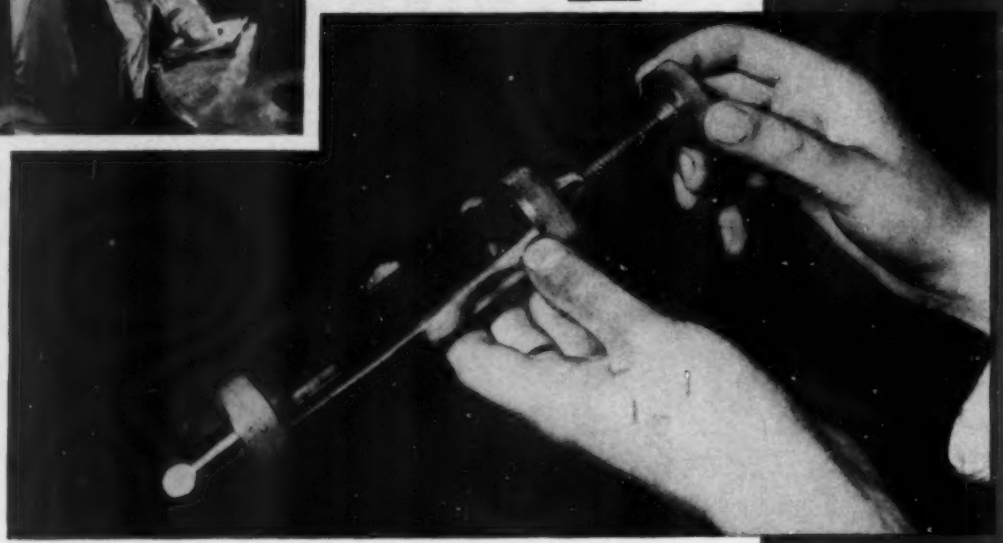
ASPIRIN AND PHENACETIN...

how Monsanto's technical service works for you

Monsanto



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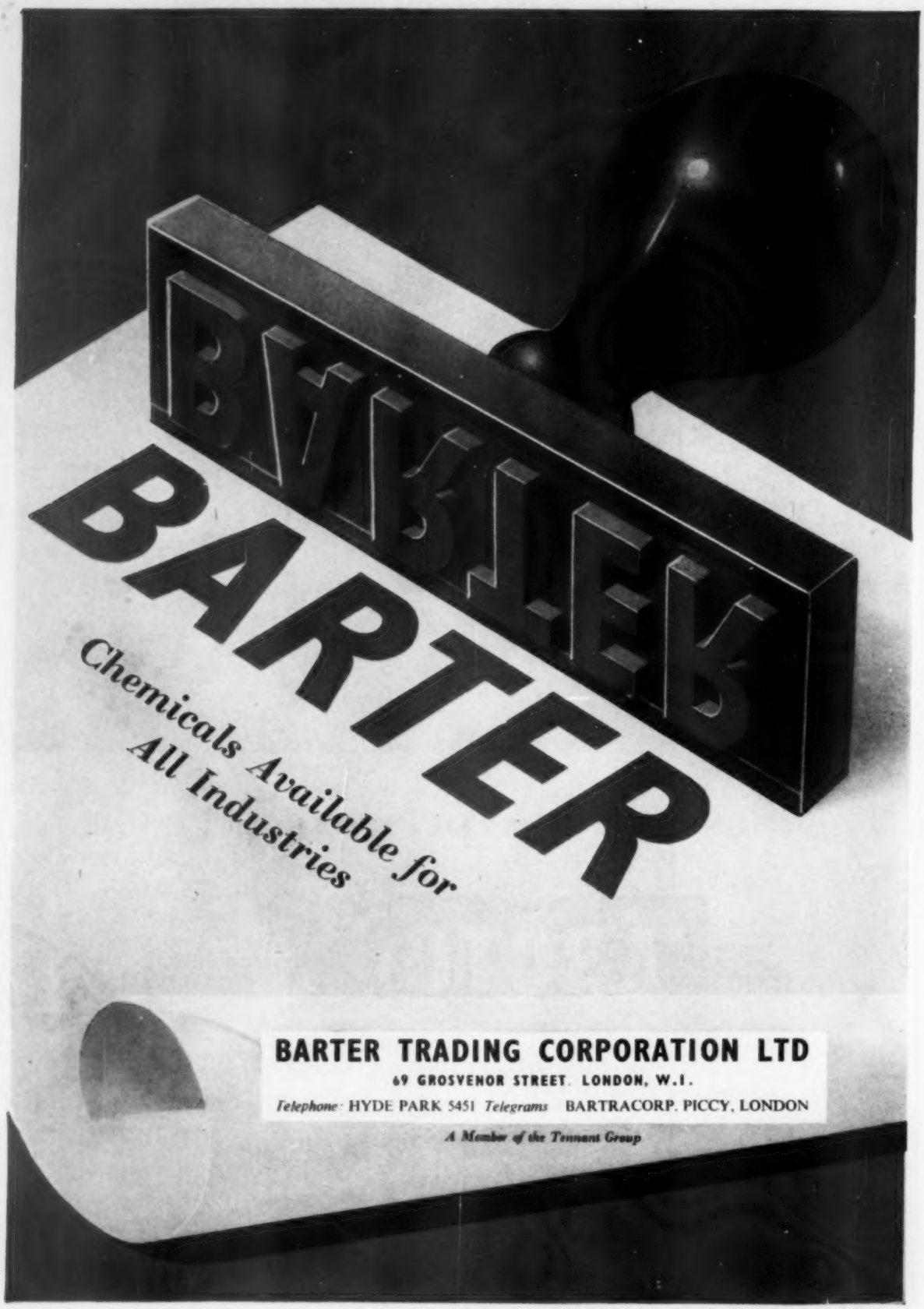
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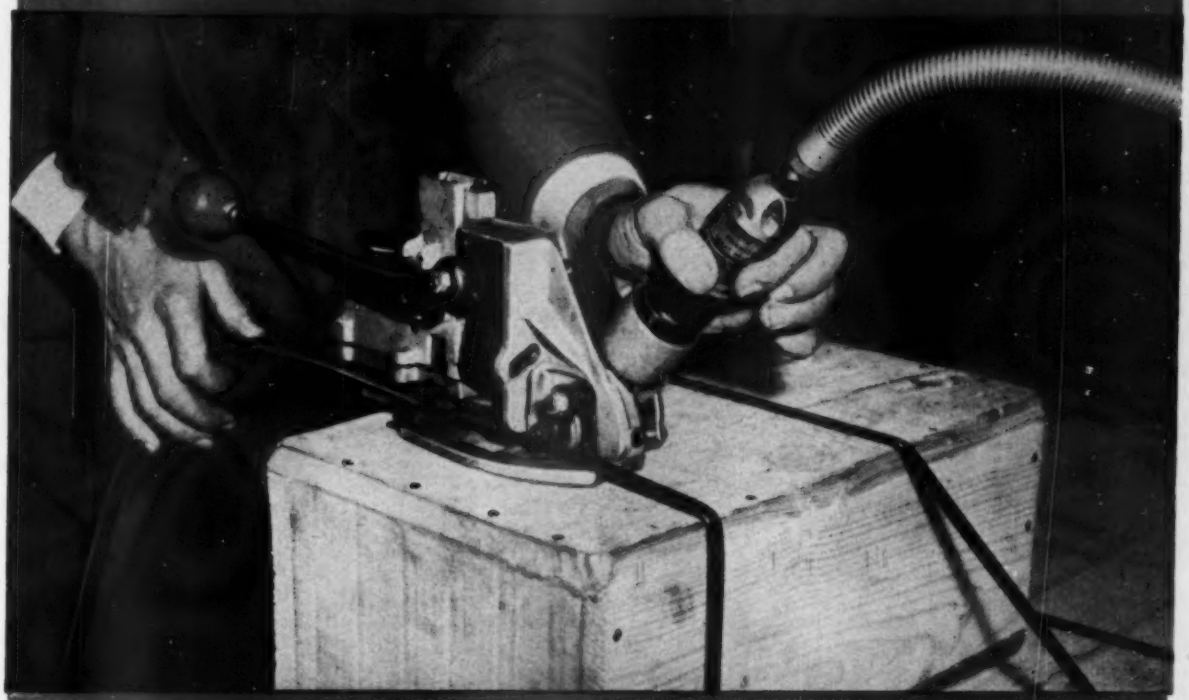

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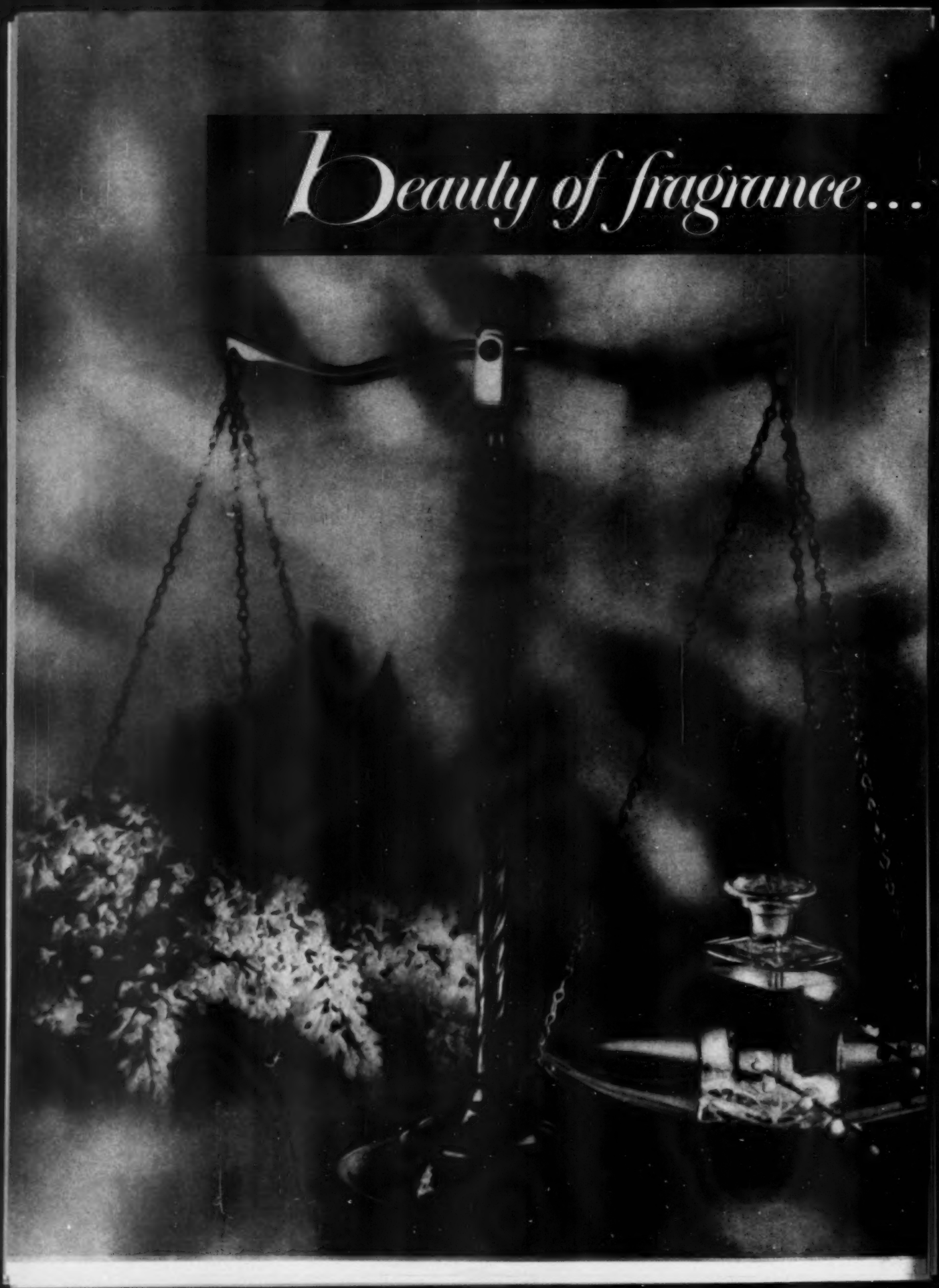
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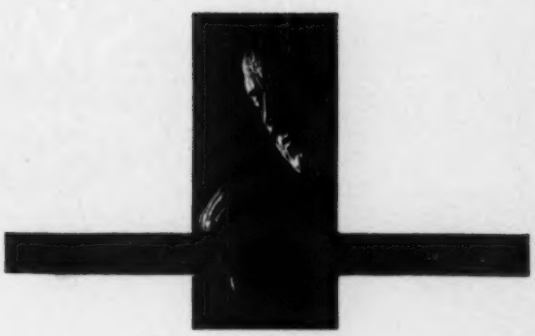
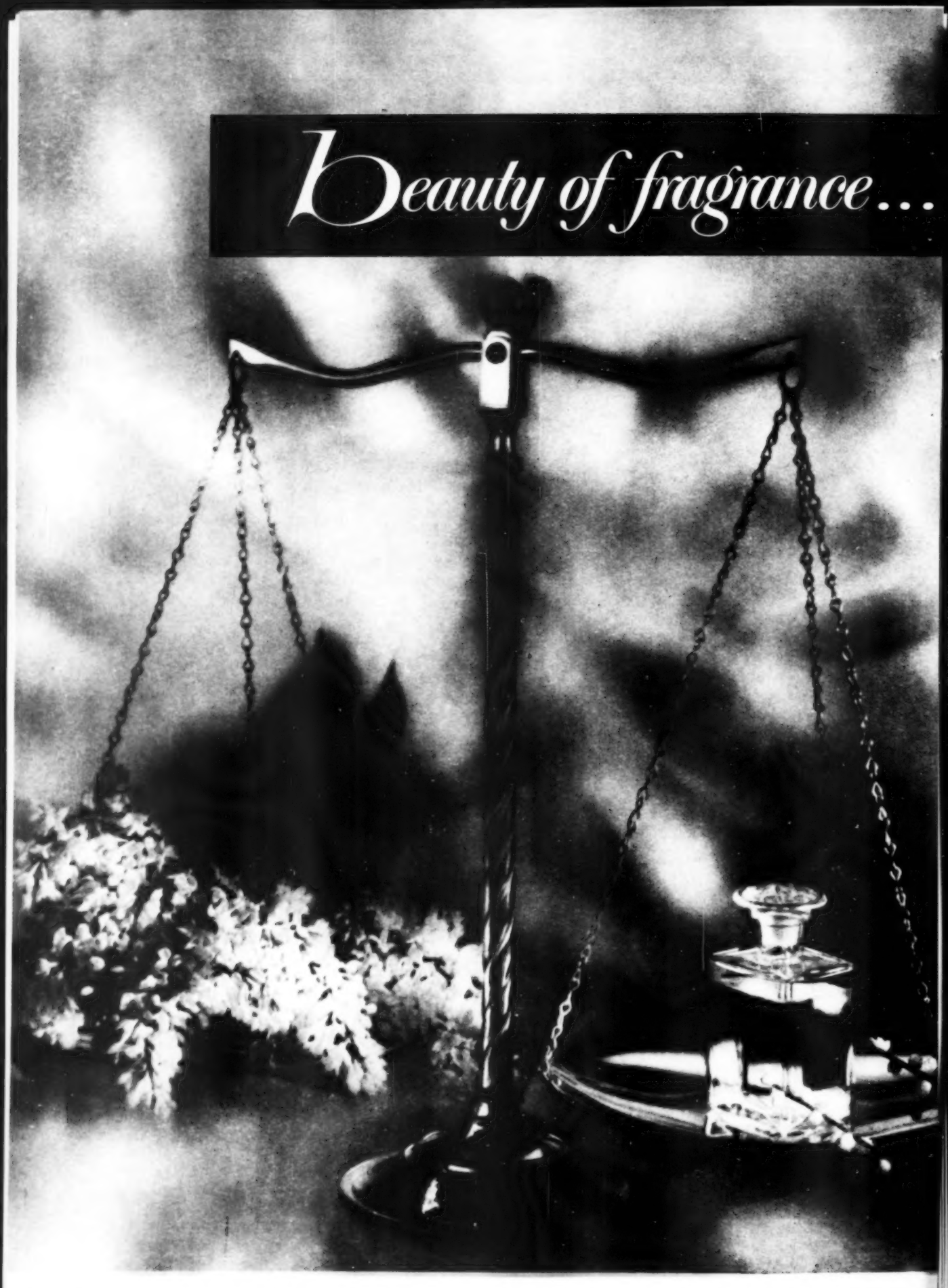
Fragrance of outstanding beauty adds the distinctive character—the individuality—that can bring success to a perfume or cosmetic...or a complete line!

Givaudan's demonstrated creative skill, its unusual variety of fragrant materials, its world-wide affiliations and its market know-how are all coordinated to bring you fragrances of unique new beauty and originality—made-to-measure for your success.

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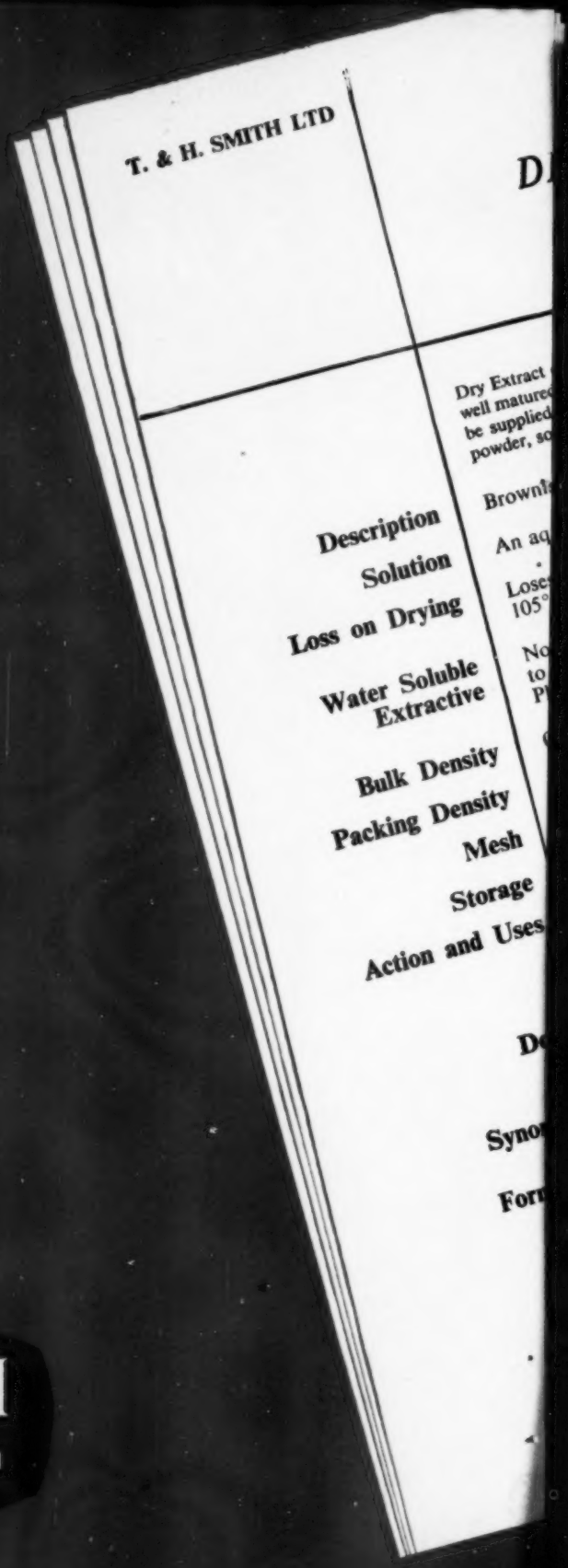

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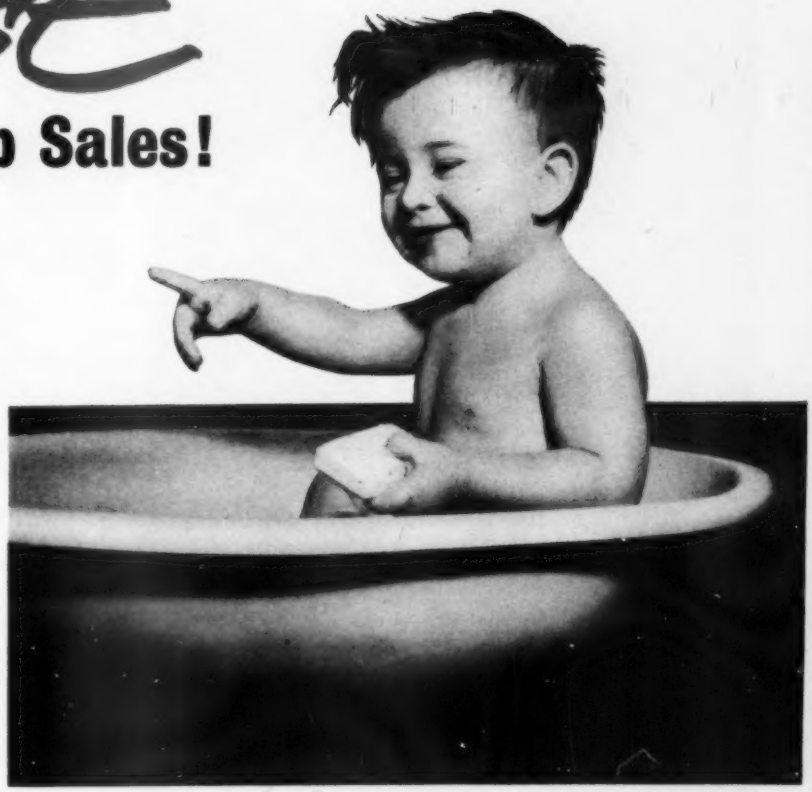
Wholly advantageous in TOILET SOAP

Let LORAMINE *Boost* *your* Toilet Soap Sales!



For the first time, here is an additive (patents applied for) that improves all the desirable properties of Toilet Soaps, without detracting from any one other property.

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Perfume Intensity—LORAMINE boosts the intensity of the perfume as well, so that major economies are possible.

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Skin Protection—LORAMINE provides a protective, silky-smooth film over the skin of the user.

Emollience—LORAMINE gives every toilet soap the smoothness, softness and creamy feel of a baby soap.

Improved Cleansing—LORAMINE actually improves the detergency of soap, yet it acts as a super-fattening agent.

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Long Preservation—LORAMINE postpones rancidity of fats and oils used in soapmaking.

Queries and Service:
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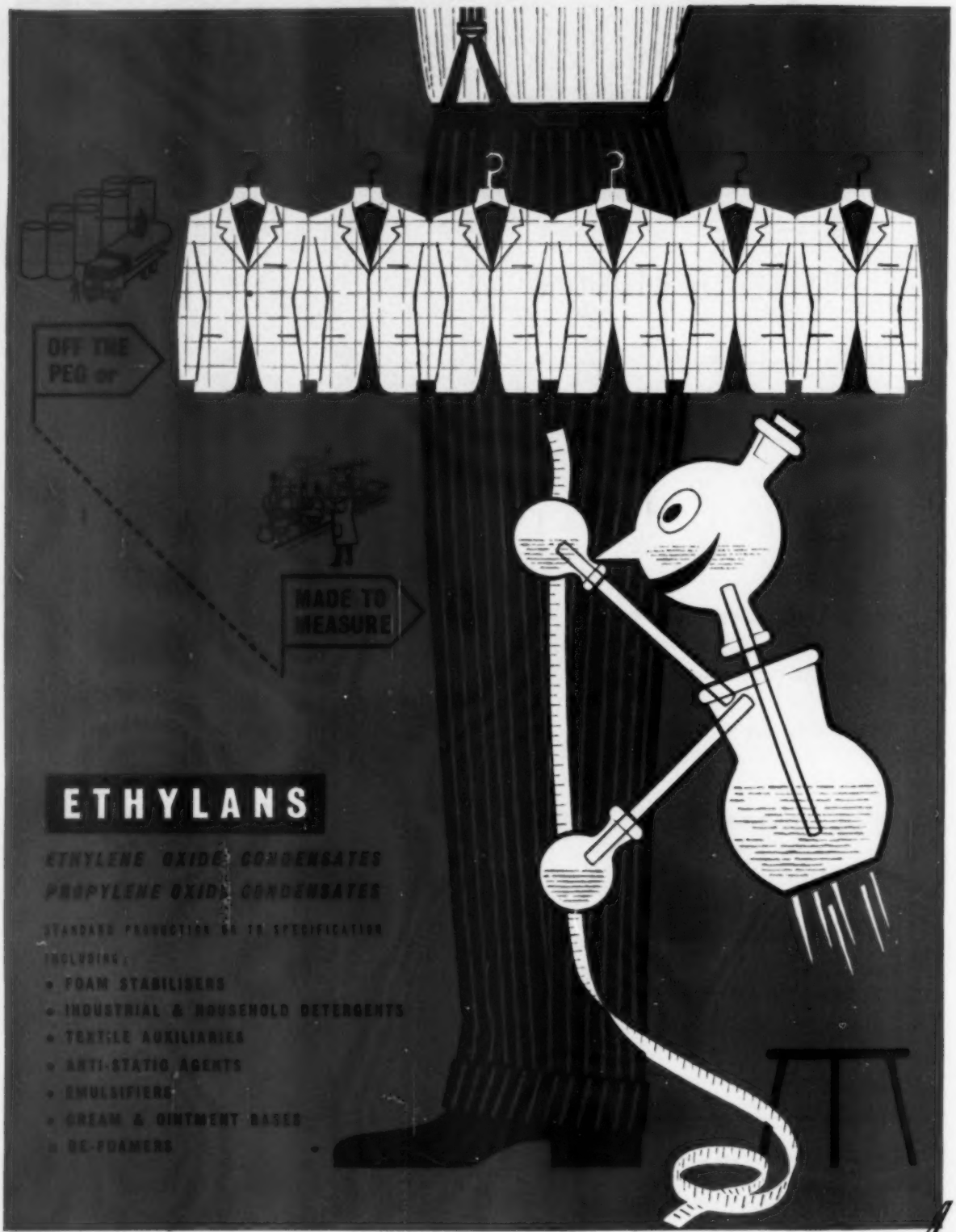

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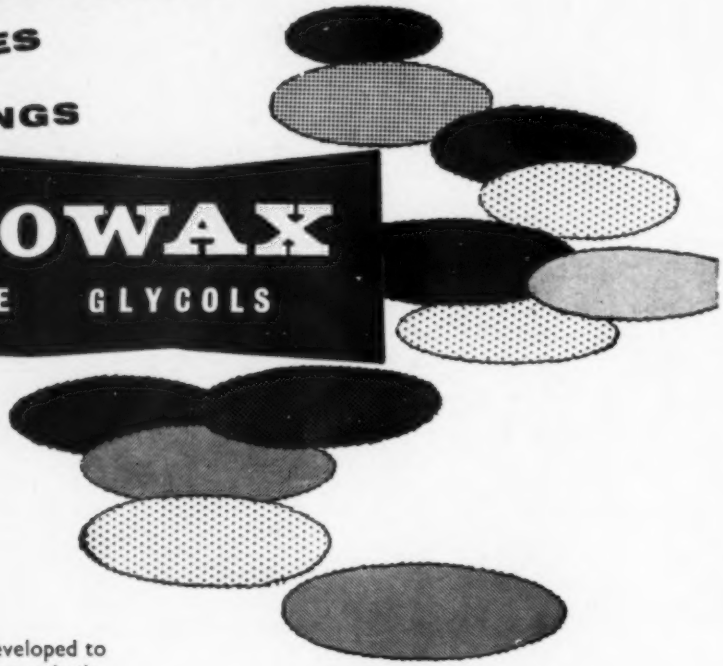

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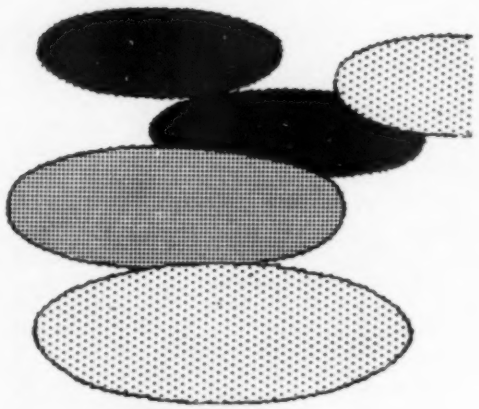
For full information including details of grade availability and technical assistance, please contact Section 10-H.



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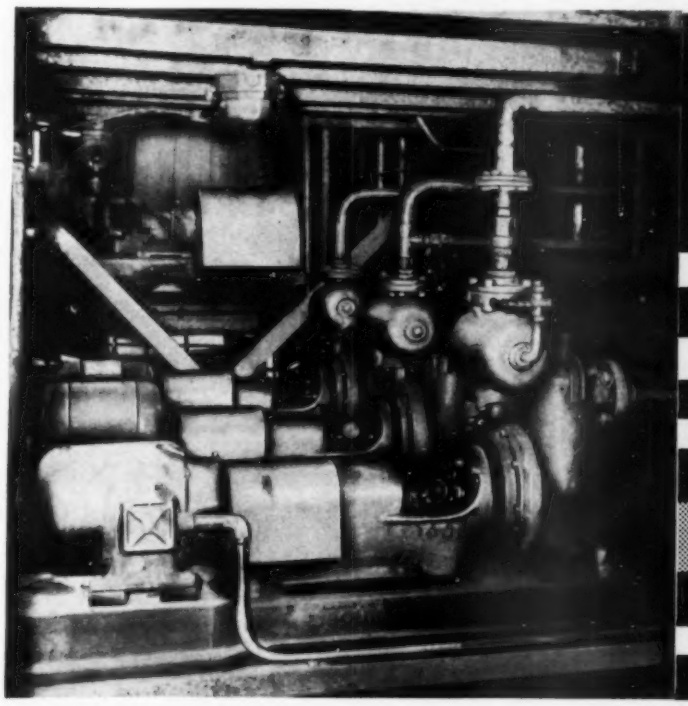

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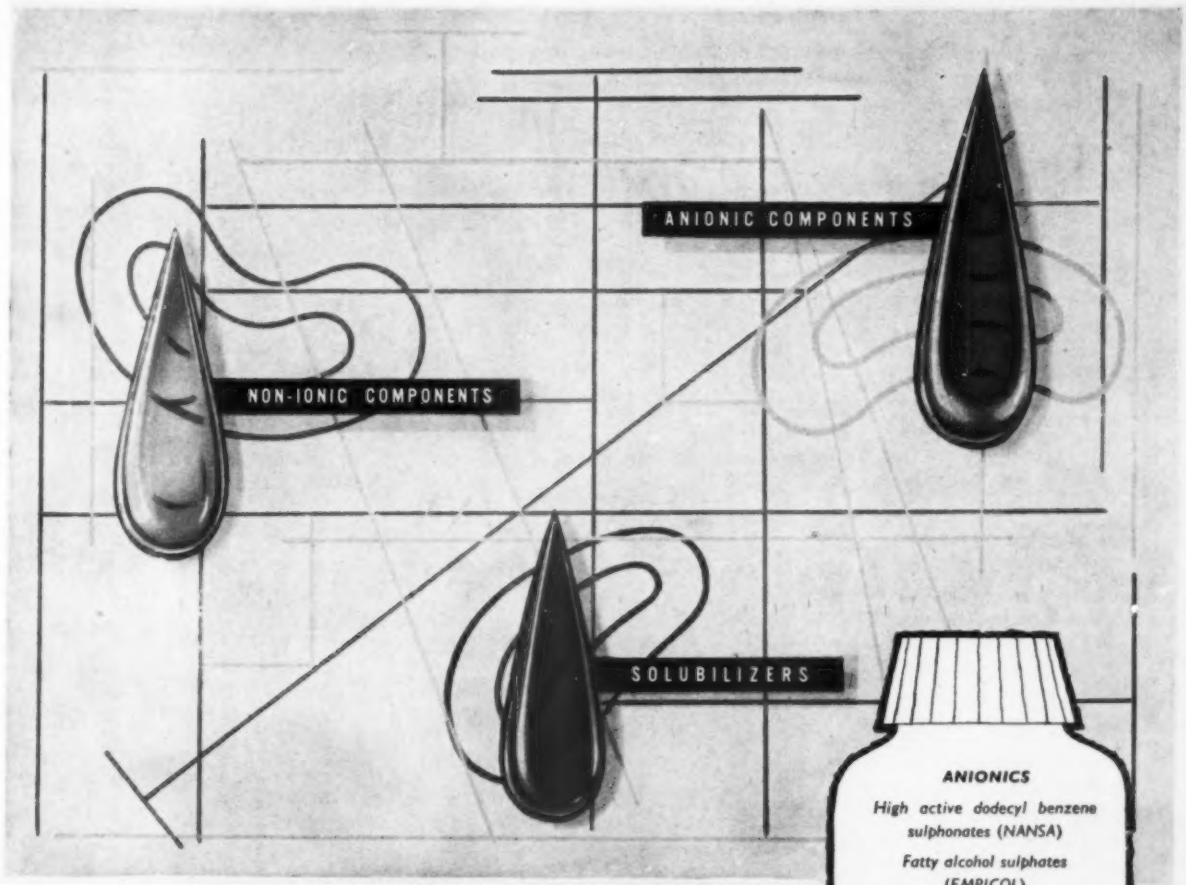

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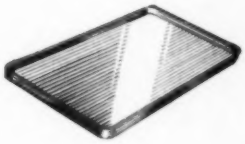

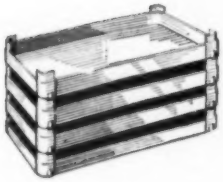

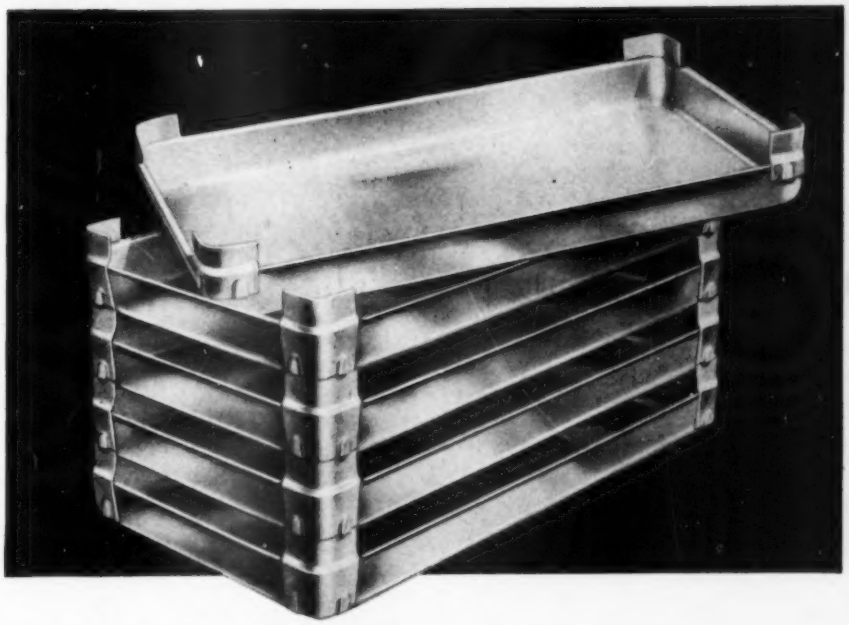

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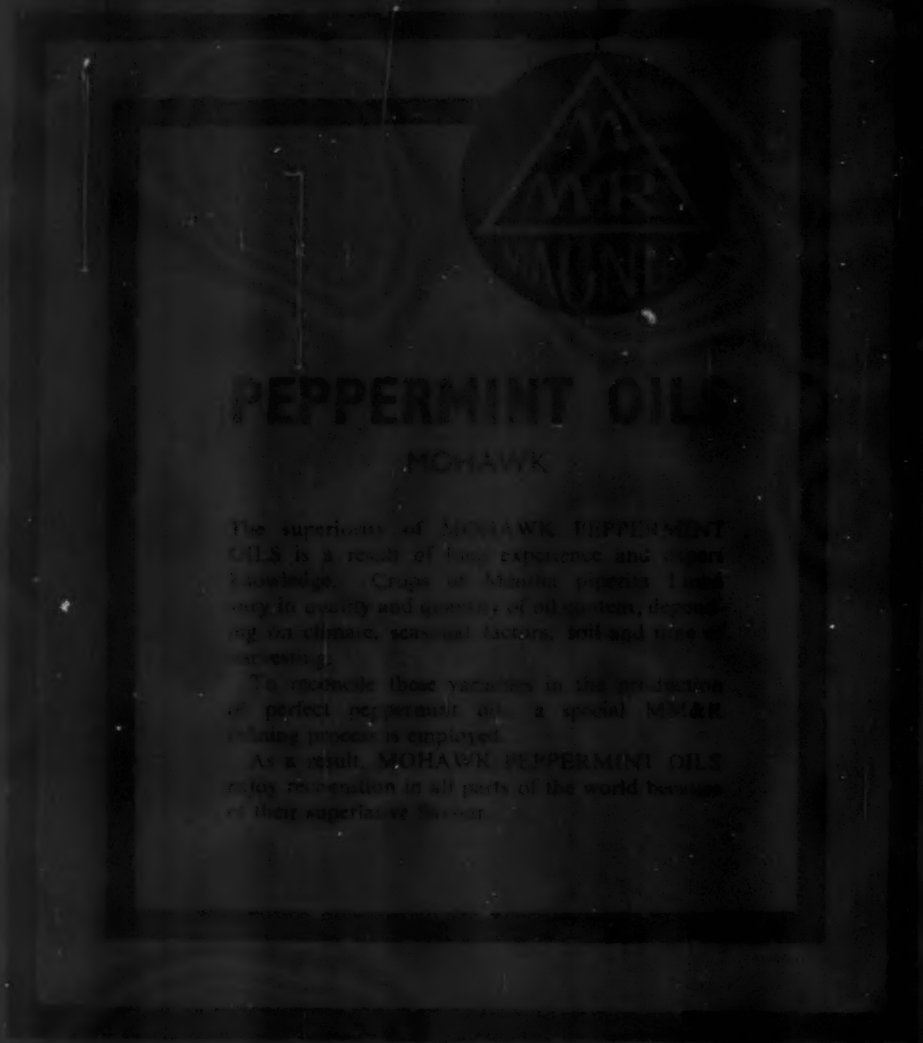
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Manufacturing Chemist

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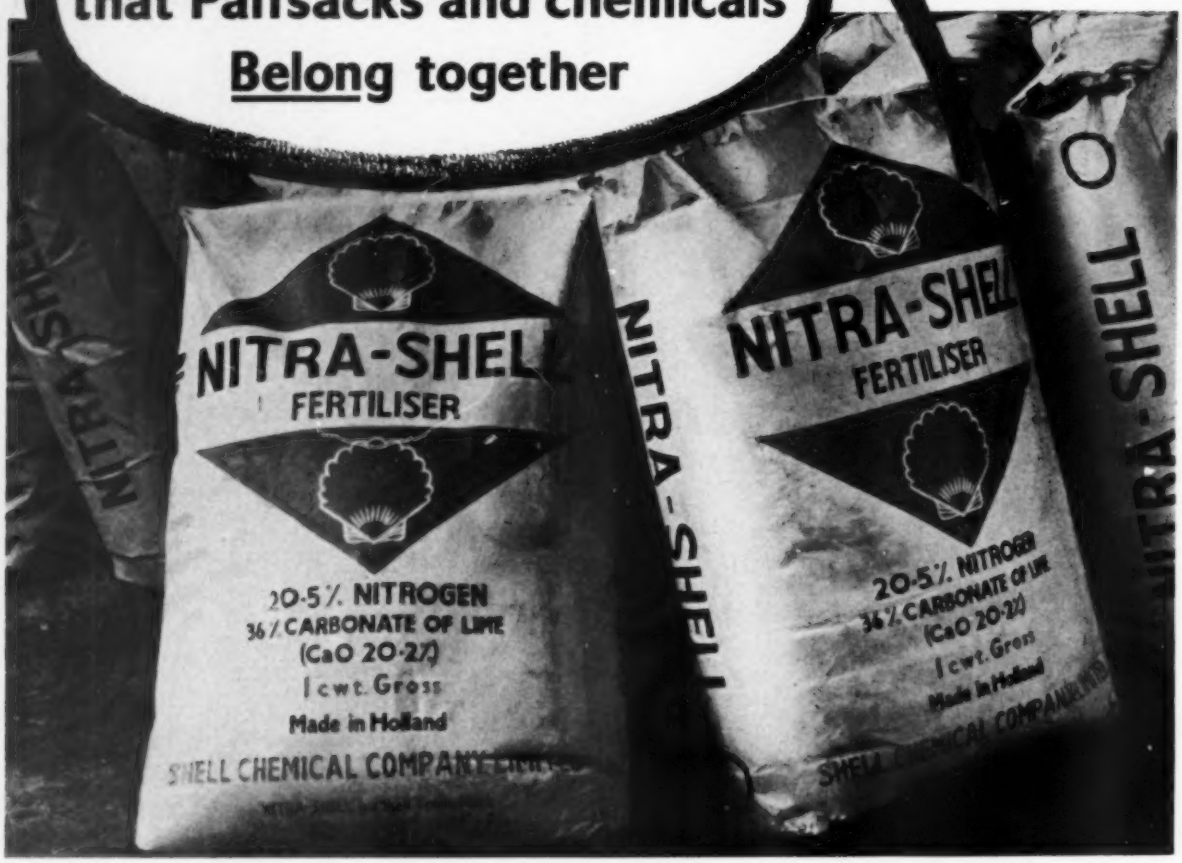

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TOPICS AND COMMENTS

Protein—and drugs—from grass

A POTENTIALLY rich source of pharmaceutical raw materials has been found in grass. The discovery is a fascinating by-product of a new process for extracting cheap but nutritious protein from vegetable material—grass, thistles, weeds, oilseeds, lucerne, etc. British Glues and Chemicals Ltd. have developed what they call Impulse Process Protein from an impulse rendering process invented by their technical director, Mr. I. H. Chayen, and introduced about seven years ago. The idea is to use mechanical beaters to set up shock waves in water. When bones are passed through the area of these shock waves the cells containing fat are instantly ruptured and the bones are thoroughly degreased and made ready for glue and gelatine manufacture.

The same method of impulse rendering is used on grass, oilseeds, etc. Vegetable cells are much softer than bone cells and are easily ruptured. Indeed this can be done so easily that there is a danger of turning the mass into an inseparable and useless emulsion. For this reason ultrasonic energy was discounted in favour of mechanical beaters transmitting sonic waves. The real problem was to find a way of separating protein, oil and fibre after the grass had passed through the rendering machine. It was recalled that two British chemists, Chibnall and Tristram, had found that vegetable protein, unlike animal protein, could be dissolved in slightly alkaline water once it was freed from the cell. So dilute alkaline water is passed into the impulse renderer with the grass. The shock waves cause a mild chemical reaction and all the oil and protein goes into solution. This is extracted from the mass in a centrifuge and treated with dilute sulphuric acid to precipitate the protein and oil as a paste. This is then dried and extracted with a solvent (acetone or toluene) with the exclusion of air to prevent oxidation. The protein is obtained as a dry, fat-free powder ready for incorporation into foods like cereals, sausages, curries and soups. The by-product is a thick syrup containing chlorophyll, carotene, xanthophylls, sterols, steroids and possibly vitamin E.

This grass syrup could have a profound effect on the economics of the Chayen Process. From 100 tons of fresh grass about 12 cwt. of syrup would be obtained, compared with 2¼ tons of pure protein and 7 tons of fibre. But this 12 cwt. of syrup could be more valuable than both other products. Even if the carotene alone could be extracted the syrup would pay its way. If starting materials for corticosteroids could also be obtained the value of the syrup would be further increased. Mr. Chayen reckons that at present the syrup is worth about 5s. per lb.

Work on methods of fractionating the syrup and identifying the constituents is proceeding at St. Andrews University, Scotland. The outcome will be of significance to the pharmaceutical industry and to the many people, particularly in India, Africa and the Middle East, who see in the Chayen Process a means of correcting the protein malnutrition which is the curse of their communities.

Gamma ray sterilisation

FOR several years there has been speculation about the possible use of gamma radiation for sterilising pharmaceuticals. In the United States certain drugs have been sterilised in this way, for example eye ointment. Any new proposal for superseding established methods of sterilising vital medical products obviously requires extremely careful consideration, and for some years now the Association of British Pharmaceutical Industry has had a working party studying irradiation sterilisation. They have had experiments carried out on the major groups of sterile drugs at Harwell and at Wantage. Their conclusions will shortly become available to A.B.P.I. members in the form of a technical report. This will be particularly interesting in view of the recent announcement by the U.K. Atomic Energy Authority of the building of an industrial irradiation plant at the Wantage Radiation Laboratories. The plant will occupy 10,000 sq. ft. and the irradiation cell itself will cover 1,000 sq. ft., including massive concrete shielding walls. The irradiation source will be 150,000 curies of Cobalt-60, which will provide a throughput of 7 megarad-tons. With this source 8 tons of medical products could be sterilised every 24 hr. Continuous utilisation is important for the economical running of such an expensive plant, since, of course, it is impossible to switch off the radiation and the source is continually decaying.

From the economic viewpoint this fact alone makes it improbable that gamma ray sterilisation can prove satisfactory for the pharmaceutical industry. It is highly unlikely that one manufacturer can have an output of sterile products high enough to justify an installation. It is significant, therefore, that although the A.E.A. announcement mentions "medical products" it does not specifically refer to pharmaceuticals. In the same context as medical products reference is made to animal fibres, so it is likely that the products meant are sutures, bone grafts, syringes and other non-pharmaceutical medical supplies.

Of course, the problem of cost could be overcome by several manufacturers sharing a gamma ray installation, but before further comment can be made the industry will want to have the views of

the A.B.P.I. working party. Questions such as effective dosage levels and chemical and colour changes produced by irradiation are among the more important to which answers will be expected.

Meanwhile the completion of the Wantage plant will give industry in general excellent facilities for discovering whether gamma rays can help them. The A.E.A. is, quite properly, anxious to exploit their use, because as the nuclear power industry develops increasing quantities of radioactive materials will become available.

Oral contraceptives

THE pressure of population on world resources, once an academic study, is now a matter of considerable social and political importance. The recognition of a problem, however, does not necessarily lead automatically to a solution, and the logical answer to the problem of an increasing world population, namely birth control, being an emotive subject, highly charged with religious, ethical and racial significance, does not yet command general acceptance.

It is sometimes forgotten that the dictum of Malthus concerning the relationship between population and food production, laid down in 1798 in his famous "Essay on the Principles of Population," is still valid, and the conventional attitude to the idea of population control may be forced to undergo a radical revision by the remorseless pressure of events.

The terrifying possibilities inherent in the present phenomenal increase in world population, so vividly described by Dr. Harrison Matthews at the recent annual meeting of the British Association in York, illustrate the fundamental seriousness of the problem.

For the large-scale control of the growth of a population, a method that is generally acceptable, cheap and reliable is essential. The final answer is yet to be found, but a potentially important step towards removing certain objections to birth control has been made by research on the prevention of conception by the use of orally administered hormone compounds. This has been made possible by the synthesis of orally active progesterone-like substances that can inhibit ovulation. The normal function of progesterone is to facilitate pregnancy by ensuring implantation of the fertilised ovum, but if present in excessive amounts, progesterone inhibits ovulation and has the reverse action of preventing fertilisation.

This effect appears to be due to a suppression of the follicular phase of the menstrual cycle, and the application of this action to the control of conception has immense implications. For practical application on a large scale an orally active compound is essential, and so far the most promising compounds discovered are the 19-nor-steroids. The most effective substance available so far is 17α ethinyl-17-hydroxy-5 (10) -œstren-3-one or norethynodrel. This compound, together with a trace of ethinyl œstradiol methyl ether and presented as 10 mg. tablets, is marketed as *Enavid* by G. D. Searle and Co. Ltd., who exhibited it at the recent meeting of the British Medical Association in Edinburgh. But it should be noted that the manufacturers do not describe it as an oral contraceptive. Its chief clinical use at present is in the treatment of functional uterine bleeding. Preliminary trials with norethynodrel have shown that in oral doses of 10 mg. daily, given from the 5th-24th day of the menstrual cycle, the compound effectively suppresses ovulation, but after cessation of treatment normal menstruation again occurs. During treatment with norethynodrel the other aspects of menstruation are relatively unchanged, although the cycles may be longer or shorter than normal.

Field trials on the suppression of fertility with this drug are now being carried out in Puerto Rico, where the population problem is considerable, and a background knowledge of the fertility rate already exists. The trials are part of a long-term study of the possibility of achieving population control by an acceptable method. The results obtained, even at this early stage of the investigation, are distinctly encouraging, and may have a profound influence on future world population problems.

New pattern of benzene demand

COAL TAR derived benzole was once used almost exclusively as motor fuel. Even 10 years ago 60% of the crude input to benzole refineries was produced as motor spirit. The increasing demand from the chemical industry for pure benzene has drastically altered the picture, and in the first half of this year less than 1% of the crude benzole input was used for motor spirit. The demand for pure benzene has increased more than sevenfold in 10 years, from 5 million gal. p.a. to 38 million gal.

This change in the pattern of demand is reflected in the new benzole refinery opened by the Lincolnshire Chemical Co. Ltd. at Scunthorpe. This is designed to make products of over 99% purity compared with the old works which was basically designed to make a refined motor spirit. The new works has a throughput of some 4½ million gal. per annum of crude benzole, of which 60% is converted to pure benzene for the chemical industry. This throughput can be increased to some 7½ million gal. p.a. if the need arises. Already the plant has proved capable of producing 425,000 gal. of nitration benzene per month. Other products include solvent and nitration toluene, xylene, solvent naphtha and indene-coumarone rich fractions.

The Lincolnshire Chemical Co. was formed in 1935 to refine crude benzole obtained from the coke ovens at the steel works of John Lysaght's Scunthorpe Works Ltd. The company today relies on the same source of supply under long term contract and also gets supplies from its associated

company, Normanby Park Tar Supply Co. (who distil the crude tar from Lysaght's), and also from the East Midlands Gas Board through the offices of Benzole Producers Ltd.

A new venture of Lincolnshire Chemical is the setting up of the Port Talbot Chemical Co. Ltd., in conjunction with the Steel Company of Wales, to treat the crude coke oven benzole available at Port Talbot. This new plant will be the first hydrorefining plant in the country to produce pure benzene.

Providing for rainless days

THE driest summer for 200 years has forced industry in some parts of the country to take stringent economy measures to eke out water supplies and prevent a disastrous fall in production. The shortage is particularly acute on Tees-side and I.C.I. have been put to a number of expedients to keep their giant Billingham Works at full production. Water for cooling purposes has been taken from the river and Billingham Beck instead of from the Tees Valley supplies. Water used in one factory for processing has been diverted to another which can make use of it. But unless there is heavy rain for several weeks even these measures will not prevent a cut back in production.

It has been calculated that in an average year the total rainfall in Britain amounts to 2,000 gal. of water per day per head of population. This is 50 times greater than average consumption. So there is plenty of water available. The problem is to trap and store it. This in turn depends on the amount of money spent on reservoirs, boreholes, pipes and water schemes generally. Wealthy water boards can provide a substantial insurance against drought. For example, there is no shortage in the London area served by the Metropolitan Water Board precisely because over the years it has been rich enough to provide not against the rainy days but against the rainless ones. In the past eight years the government has authorised the spending of over £200 million for the improvement of water supplies and it is without doubt due to this that the country generally has been able to get through a quite abnormal summer. The water advisory committee of the Ministry of Housing and Local Government has advised against the building of a national water grid on the grounds of excessive expense. Truly it would be an enormous undertaking to pipe water around the country in the way we transmit electricity. And in nine years out of ten it would probably be a quite unnecessary insurance.

The 1,100 water undertakings in England and Wales and those in Scotland and Northern Ireland, too, should be encouraged to follow the example of the Metropolitan Water Board and put in hand schemes to trap and store enough water to last their areas at least a year. For even apart from dry summers, there is no doubt that water demand is steadily rising. Factory managements, too, can help by instituting the strictest economy in water consumption.

Compulsory Latin?

A LITTLE knowledge is a dangerous thing, and less knowledge even more dangerous.

An illustrative example is that of the elderly man who was recently found guilty but insane on a charge of wife murder. The prescription for her medicine bore the letters M.D.U., an abbreviation for "more dicto utendum," or in the vulgar tongue "to be used as directed." The husband took the letters M.D. as an indication that his wife was mentally deficient, and for this rather inadequate reason he killed her with a mallet.

A further danger of medical mystery has recently been pointed out. Some doctors, with the kindly object of saving their patients from paying too many shilling prescription charges, have taken to prescribing sedatives, tranquillisers, etc., in unnecessarily large quantities. Bathroom cupboards thus become stocked with bottles bearing anonymous labels such as "The Tablets," the nature of whose contents is forgotten until the baby finds them and consumes them with disastrous results.

The British Pharmaceutical Code has taken a forward step by cutting down on its Latin. Is it not time that prescription symbols, meaningless labels and illegible medical handwriting also gave way to a little modern clarity?

Golden fleece

THE pharmaceutical industry's veterinary market is expanding rapidly and is likely to continue in this way if farmers can be shown such encouraging results as those obtained with sheep which had been dosed with vitamin D_3. The rationale of the treatment is that British sheep (with the possible exception of this year's remarkable summer) do not get enough sunshine for them to synthesise sufficient vitamin D_3 for bone growth, muscular development and wool growth. Indeed it is argued that even in a good British summer the sheep's own fleece acts as a barrier to the sunshine. Artificial addition of vitamin D_3 was therefore tried out in experiments made this summer by the West Cumberland Farmers' Trading Society and the Crookes' Laboratories Ltd., makers of *Suntax* vitamin D preparation. According to Mr. J. Walne, M.P.S., pharmaceutical manager of the Society, the results are "quite incredible." Lambs reared on injected ewes grew faster than lambs reared on non-treated ewes. At 12 weeks these lambs were on the average 6 lb. 11 oz. heavier and lambs reared on twice dosed ewes were 7 lb. 7 oz. heavier. The fleeces of the treated sheep also showed great improvement, 16% reaching top grade, 75% second grade and only 9% low grade, compared with 2% top grade and 98% low grade from untreated sheep. Fleeces clipped from treated sheep fetched on an average 5s. more than fleeces from the controls. Improvements like these more than justify the cost of the injections—8d. per 2 c.c. dose.

Hill sheep in particular benefited from the vita-

min treatment. Since there are approximately 8½ million of them in Great Britain and Northern Ireland the market potential for the "sunshine" vitamin is obviously very good. Britain's £71 million sheep industry stands to gain thousands of pounds by the systematic adoption of vitamin D_3 injections, and vitamin manufacturers stand to gain a considerable additional outlet for their products.

Closed minds

THE more one sees and speaks to present-day scientists, the more uneasy one feels about their intense preoccupation with science. In this day and age, when rapid developments in electronics and nuclear physics have brought us to the beginning of a new era in science and technology, vital and urgent social and ethical problems are raised and we have need, more than ever before, of scientists who have a broad streak of the philosopher and humanitarian in them. But present-day educational systems, with their emphasis on specialisation, tend to turn out individuals who have been trained to close their minds to any considerations other than those immediately connected with their chosen field of study.

Sir Alexander Fleck, chairman of I.C.I., points out that a "polarised" educational system has rendered intellectual contact between the scientist and the non-scientist inordinately difficult because communication between them is being gradually destroyed. Speaking at a conference on radiological health and safety at New College, Oxford, he expressed the need for more minds in which the scientific attitude and the classical or historical tradition co-exist. Recalling his early days at I.C.I. Billingham, when that organisation was in its stage of evolving rapidly almost overnight from concept to practice, he said it was believed in those days that technical problems could be solved by handing them to a team consisting of a chemist and an engineer. This was not so any longer, for it is now seen that chemical engineers are more than the sum of their parts.

Chemical engineering is, indeed, a following which calls for breadth of vision as well as breadth of knowledge in the individual and in its revised "Scheme for a Full-time Course in Chemical Engineering" (May 1959, 2s.), the Institution of Chemical Engineers rightly emphasises that encouraging students to exercise originality and initiative to the full should be a primary object of any course of training. The point is also made that teaching should not be so intensive that the student has not time to assimilate facts and think for himself. The most important point about the new Scheme is that chemical engineering topics are part of the course from the very first day, instead of being left until the third year as previously. This takes a step in the right direction, for nothing has contributed more to the muddled outlook of many present-day scientists than the lack of an overall guiding philosophy to weld together numerous separate subjects.

Chemical technologist

FIFTY years ago there died in Hampstead a German who, in the last half of the nineteenth century, helped change the face of the chemical industry. He was Ludwig Mond, a native of Cassel, who made his home here in 1862, and was naturalised 18 years later.

Germany and Holland had had a foretaste of Mond's genius for turning discoveries in pure science into industrial potential. His researches into sulphur recovery, and the production of ammonia from waste leather, were well known, and it was in this field he extended his probings in England.

His first English patent was for sulphur recovery from the Leblanc alkali-waste by partial oxidation and acid treatment. Mond associated himself with Hutchinson of Widnes to perfect this, becoming a partner in 1867.

Five years later came his collaboration with John Brunner, when the two men furthered the Solvay ammonia-soda process at Winnington, Northwich. By intensive labour, Mond turned this near-failure into success, and from it sprang the world-famous alkali firm of Brunner, Mond and Co., a directorship of which Mond held till death.

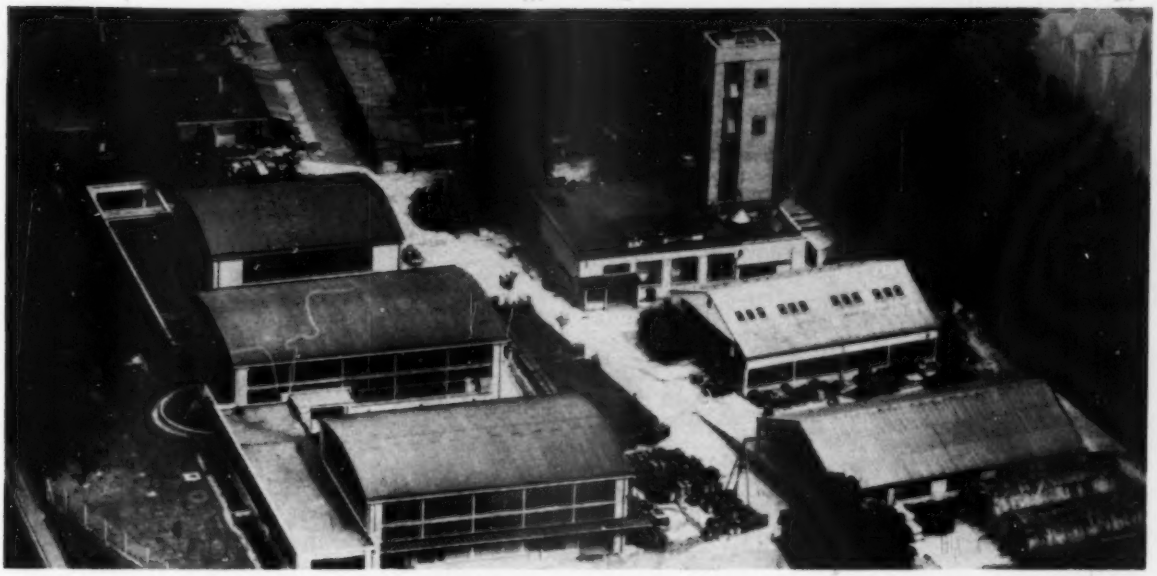
In 1888 he patented the producer-gas plant evolved by experimentation in the use of cyanides. Air and steam, led over heated coke or coal in a carefully-regulated furnace, converted the fuel nitrogen into easily-recoverable ammonia generating a cheap form of producer-gas ("Mond-gas").

Two years later he helped Langer convert fuel heat energy into electricity by improving the Grove gas battery. To separate hydrogen from oxygen, interesting results were obtained by using porous plates moistened with sulphuric acid faced with platinum and platinum black. But cell defects prevented complete success. From this Mond went on to experiment (in collaboration with Ramsay and Shields) on occlusion of hydrogen and oxygen by platinum and palladium.

During 1886-89 Mond concentrated on the recovery of chlorine wasted in the ammonia-soda process as calcium chloride. Instead of lime, he used first nickel oxide and then magnesium to decompose ammonium chloride, and he obtained easily-decomposible chlorides from which chlorine could be recovered by air or steam treatment in elementary or hydrochloric acid form. Mond took out several patents on these processes.

With Langer and Quincke, he discovered nickel carbonyl, a gaseous compound of nickel and carbon monoxide, and this led to a means of extracting nickel from its ores. The Mond Nickel Co., with mines in Canada and model works near Swansea, was formed to work this process. Later the three men discovered iron carbonyls.

Indomitable, resourceful, immensely energetic, Ludwig Mond considered that all industrial chemists should be trained in pure science. He died on December 11, 1909, worth over a million.



This view of Givaudan's Whyteleafe factory shows the three new production buildings and the brick tower housing chimneys and water cooling equipment.

A Factory Which Serves the Perfumer

By W. G. Norris

Since 1950 Givaudan and Co. Ltd. have been developing a factory at Whyteleafe, Surrey, for the manufacture of aromatic chemicals and perfume bases. The factory now contains some of the largest and most modern chemical plants of their kind and recently technical service laboratories have been added. Here is a description of the current stage of development of the British branch of this famous international house.

ALTHOUGH Givaudan products have been known and used in this country for 50 years, until 1950 they were imported. In 1950 Givaudan were finally able to commence manufacturing operations in the U.K., as even before the war a market for their products was rapidly developing in this country. But the war delayed the establishment of a factory in Britain.

The British company of Givaudan and Co. Ltd. was formed with a capital of £300,000 and a factory at Godstone Road, Whyteleafe, Surrey—about 16 miles from London—was bought. The site has been steadily developed until now one-third of its 3½ acres are built on. The factory is now fully equipped to make the extensive Givaudan range of natural and synthetic perfumes and bases. Its technical service laboratories in which perfumes are created and adapted to customers' special needs are also fully working now.

Executive staff

The chairman of Givaudan and Co. Ltd. is Mr. André Givaudan, son of M. Xavier Givaudan, who with his brother Leon founded the company in 1895. The managing director at Whyteleafe is Mr. H. J. Widdows, who has had a lifetime's experience in the chemical and perfumery industries. The technical director is Dr. V. Klein and the head of the technical service department is Mr. R. E. Eckton, M.A. The perfumer is Mr. D. P. Stagg.

Technical service

With the completion of the technical service laboratories and the erection and equipping of a third new production building, Givaudan-Whyteleafe is able to take full advantage of the increasing market for aromatic chemicals and perfumery in this country. Manufacturers of soap, cosmetics, toilet preparations, disinfectants, insecticides, polishes, etc., are intensifying the olfactory appeal of their products. For example, selling toilet soap today is largely a matter of selling a pleasant smell. The public is developing an appreciative and discriminating nose for perfumes and manufacturers of aromatics have to be ingenious and versatile to satisfy the needs of customers seek-

min treatment. Since there are approximately 8½ million of them in Great Britain and Northern Ireland the market potential for the "sunshine" vitamin is obviously very good. Britain's £71 million sheep industry stands to gain thousands of pounds by the systematic adoption of vitamin D_3 injections, and vitamin manufacturers stand to gain a considerable additional outlet for their products.

Closed minds

THE more one sees and speaks to present-day scientists, the more uneasy one feels about their intense preoccupation with science. In this day and age, when rapid developments in electronics and nuclear physics have brought us to the beginning of a new era in science and technology, vital and urgent social and ethical problems are raised and we have need, more than ever before, of scientists who have a broad streak of the philosopher and humanitarian in them. But present-day educational systems, with their emphasis on specialisation, tend to turn out individuals who have been trained to close their minds to any considerations other than those immediately connected with their chosen field of study.

Sir Alexander Fleck, chairman of I.C.I., points out that a "polarised" educational system has rendered intellectual contact between the scientist and the non-scientist inordinately difficult because communication between them is being gradually destroyed. Speaking at a conference on radiological health and safety at New College, Oxford, he expressed the need for more minds in which the scientific attitude and the classical or historical tradition co-exist. Recalling his early days at I.C.I. Billingham, when that organisation was in its stage of evolving rapidly almost overnight from concept to practice, he said it was believed in those days that technical problems could be solved by handing them to a team consisting of a chemist and an engineer. This was not so any longer, for it is now seen that chemical engineers are more than the sum of their parts.

Chemical engineering is, indeed, a following which calls for breadth of vision as well as breadth of knowledge in the individual and in its revised "Scheme for a Full-time Course in Chemical Engineering" (May 1959, 2s.), the Institution of Chemical Engineers rightly emphasises that encouraging students to exercise originality and initiative to the full should be a primary object of any course of training. The point is also made that teaching should not be so intensive that the student has not time to assimilate facts and think for himself. The most important point about the new Scheme is that chemical engineering topics are part of the course from the very first day, instead of being left until the third year as previously. This takes a step in the right direction, for nothing has contributed more to the muddled outlook of many present-day scientists than the lack of an overall guiding philosophy to weld together numerous separate subjects.

Chemical technologist

FIFTY years ago there died in Hampstead a German who, in the last half of the nineteenth century, helped change the face of the chemical industry. He was Ludwig Mond, a native of Cassel, who made his home here in 1862, and was naturalised 18 years later.

Germany and Holland had had a foretaste of Mond's genius for turning discoveries in pure science into industrial potential. His researches into sulphur recovery, and the production of ammonia from waste leather, were well known, and it was in this field he extended his probings in England.

His first English patent was for sulphur recovery from the Leblanc alkali-waste by partial oxidation and acid treatment. Mond associated himself with Hutchinson of Widnes to perfect this, becoming a partner in 1867.

Five years later came his collaboration with John Brunner, when the two men furthered the Solvay ammonia-soda process at Winnington, Northwich. By intensive labour, Mond turned this near-failure into success, and from it sprang the world-famous alkali firm of Brunner, Mond and Co., a directorship of which Mond held till death.

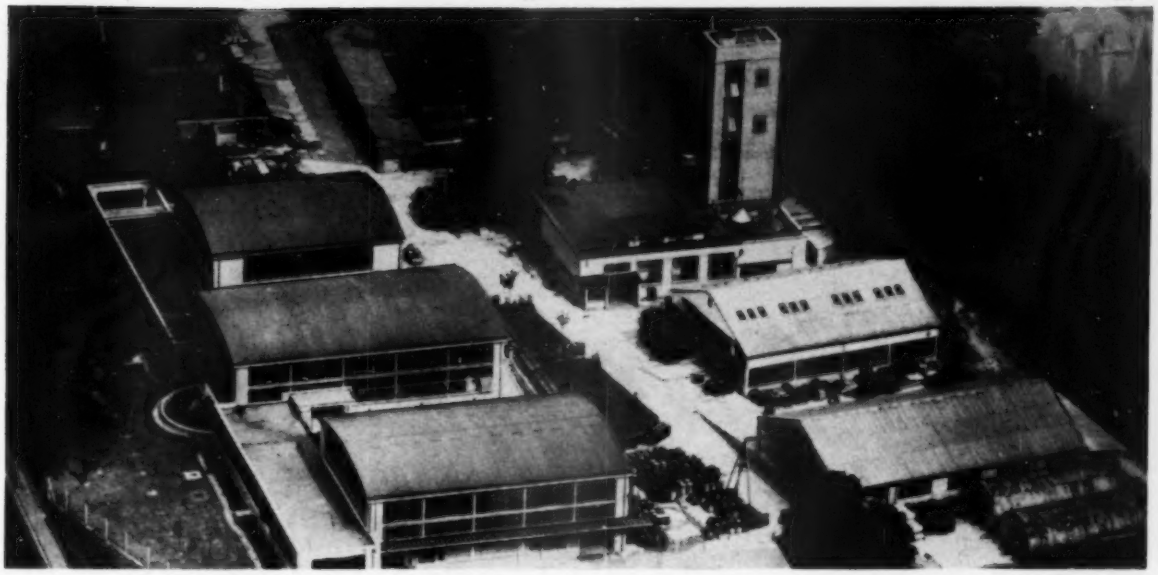
In 1888 he patented the producer-gas plant evolved by experimentation in the use of cyanides. Air and steam, led over heated coke or coal in a carefully-regulated furnace, converted the fuel nitrogen into easily-recoverable ammonia generating a cheap form of producer-gas ("Mond-gas").

Two years later he helped Langer convert fuel heat energy into electricity by improving the Grove gas battery. To separate hydrogen from oxygen, interesting results were obtained by using porous plates moistened with sulphuric acid faced with platinum and platinum black. But cell defects prevented complete success. From this Mond went on to experiment (in collaboration with Ramsay and Shields) on occlusion of hydrogen and oxygen by platinum and palladium.

During 1886-89 Mond concentrated on the recovery of chlorine wasted in the ammonia-soda process as calcium chloride. Instead of lime, he used first nickel oxide and then magnesium to decompose ammonium chloride, and he obtained easily-decomposible chlorides from which chlorine could be recovered by air or steam treatment in elementary or hydrochloric acid form. Mond took out several patents on these processes.

With Langer and Quincke, he discovered nickel carbonyl, a gaseous compound of nickel and carbon monoxide, and this led to a means of extracting nickel from its ores. The Mond Nickel Co., with mines in Canada and model works near Swansea, was formed to work this process. Later the three men discovered iron carbonyls.

Indomitable, resourceful, immensely energetic, Ludwig Mond considered that all industrial chemists should be trained in pure science. He died on December 11, 1909, worth over a million.



This view of Givaudan's Whyteleafe factory shows the three new production buildings and the brick tower housing chimneys and water cooling equipment.

A Factory Which Serves the Perfumer

By W. G. Norris

Since 1950 Givaudan and Co. Ltd. have been developing a factory at Whyteleafe, Surrey, for the manufacture of aromatic chemicals and perfume bases. The factory now contains some of the largest and most modern chemical plants of their kind and recently technical service laboratories have been added. Here is a description of the current stage of development of the British branch of this famous international house.

ALTHOUGH Givaudan products have been known and used in this country for 50 years, until 1950 they were imported. In 1950 Givaudan were finally able to commence manufacturing operations in the U.K., as even before the war a market for their products was rapidly developing in this country. But the war delayed the establishment of a factory in Britain.

The British company of Givaudan and Co. Ltd. was formed with a capital of £300,000 and a factory at Godstone Road, Whyteleafe, Surrey—about 16 miles from London—was bought. The site has been steadily developed until now one-third of its 3½ acres are built on. The factory is now fully equipped to make the extensive Givaudan range of natural and synthetic perfumes and bases. Its technical service laboratories in which perfumes are created and adapted to customers' special needs are also fully working now.

Executive staff

The chairman of Givaudan and Co. Ltd. is Mr. André Givaudan, son of M. Xavier Givaudan, who with his brother Leon founded the company in 1895. The managing director at Whyteleafe is Mr. H. J. Widdows, who has had a lifetime's experience in the chemical and perfumery industries. The technical director is Dr. V. Klein and the head of the technical service department is Mr. R. E. Eckton, M.A. The perfumer is Mr. D. P. Stagg.

Technical service

With the completion of the technical service laboratories and the erection and equipping of a third new production building, Givaudan-Whyteleafe is able to take full advantage of the increasing market for aromatic chemicals and perfumery in this country. Manufacturers of soap, cosmetics, toilet preparations, disinfectants, insecticides, polishes, etc., are intensifying the olfactory appeal of their products. For example, selling toilet soap today is largely a matter of selling a pleasant smell. The public is developing an appreciative and discriminating nose for perfumes and manufacturers of aromatics have to be ingenious and versatile to satisfy the needs of customers seek-

Plant for producing aromatic chemicals in one of the new production buildings.

ing olfactory distinction for their products.

Among the important customers for aromatic chemicals are the soap and aerosol industries. The larger soap makers usually purchase synthetic aromatics and manufacture their own perfume compounds, but medium size and small makers ask Givaudan to provide compounds—sometimes to their own formulæ but often to one created specially for them by Givaudan. Thus, a laboratory-scale soapmaking plant is essential equipment at Whyteleafe. The increasing use of synthetic detergents, both as straight washing powders, liquids and pastes, and as components of toilet soaps, necessitates constant adaptation of formulæ. Generally it is found that if an old-established favourite is not compatible with a new soap formulation, a suitable synthetic imitation is readily available. Outstanding among the newer synthetics for soap is Givaudan's *Lilial*, which was discovered by Givaudan-Delawanna, the U.S. company.

Another product widely used in soap is cyclamen aldehyde, and a new plant to make it in tonnage quantities has just been commissioned at Whyteleafe.

Aerosols

The aerosol industry requires perfumes for products ranging from shave-lather to fly sprays. At Whyteleafe a great deal of work is done on aerosol perfumes, and equipment includes a laboratory aerosol filling unit which enables perfumes to be tested in the base product under the actual conditions of use. As in the case of all products, the problem is to provide the customer with the note he needs at the price he wants to pay. A fly spray manufacturer, for instance, may want a perfume which will add no more than 6d. a gallon to the cost of his spray; perhaps all he needs is something to mask its intrinsic odour. Many, of course, find it pays them to spend considerably more. In all cases it is advantageous for the customer to supply a sample of his base product and to specify the aerosol pack he proposes to use, so that every aspect of compatibility—can, valve, internal lacquer, etc.—can be tested.

One of the latest trends—the dispensing of perfumes and toilet waters in aerosol packs—is being given due attention at Whyteleafe, and it seems likely that a number of "push button" perfumes will soon be competing for the public's favour.

Some products are difficult to perfume because of their marked chemical activity and/or unpleasant odour. In this category come hair-waving and allied preparations based on thioglycollates, but Givaudan have perfected a varied range of perfumes for this purpose, including fougère, rose, lavender, sweet pea and wistaria.

Givaudan-Whyteleafe are able to call on the resources of Givaudan in Geneva, Paris, Sao Paulo and Delawanna to find the right smell at the right price. Often they can provide what is needed from stock, but, of course, it is often necessary to adapt perfumes to suit Anglo-Saxon noses.

An improved accelerated testing unit, employing heat and ultra-violet light, is to be installed shortly. It will be identical with the units used at Geneva and Delawanna, because, of course, standardisation is necessary in a world-wide organisation.

The manufacture of high-class compounds for perfumes and toilet water is, of course, an extremely important part of Givaudan's business—far more important than industrial perfumes. Their bases and specialities are used in a great number of famous and distinguished creations and they also manufacture complete compounds to customers' specifications to suit every price level. The perfuming of cosmetics and toilet preparations is also a big business at Whyteleafe, and the laboratory scale units for making trial batches of cosmetics are in constant use.

At the other end of the aromatic scale, there is a demand for industrial deodorants and masking agents. Illustrative of this trend is the perfuming of imitation flowers made from polythene. Here the problem is to incorporate a smell in a plastic. Another trend is the introduction of deodorants into the ventilation system of factories to make unavoidably malodorous processes tolerable to employees.

This brief outline of the work of the technical service department at Whyteleafe is of necessity general rather than particular, because much of what is done is confidential between Givaudan and their many customers, large and small. Sufficient has been said, however, to show that at Whyteleafe there are now facilities to solve almost any problem in perfumery.

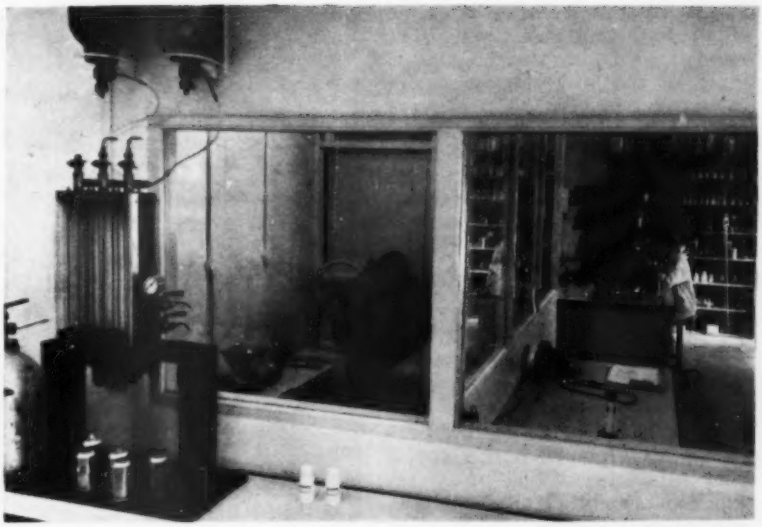
Aromatic chemical plants

No one with an appreciation of chemical manufacture can fail to be impressed by the extensive plant that has been erected at Whyteleafe and is now fully operative under the direction of Dr. Klein. A

number of small buildings that were on the site when Givaudan arrived in 1950 are still being used, but they are now overshadowed by the four large buildings that house chemical plants and the stills. The new buildings have been partly built on piles and partly on concrete rafts to take the weight of the heavy plant. They are constructed of prefabricated and prestressed concrete and brick. A great deal of glass has been used and this, in combination with the single span concrete roofs, gives a pleasing effect of light and space. For safety reasons the buildings are structurally separate, but three of them present a continuous frontage to the road, being connected by narrow wings containing auxiliary services. All manufacturing areas are flameproof, but money has been saved by placing switches and control gear outside the buildings, so avoiding the expense of flameproof equipment.

Great care has been taken to avoid air pollution. For instance, in the distillation hall each still is linked to a central exhaust system where fumes are absorbed in chambers of activated carbon.

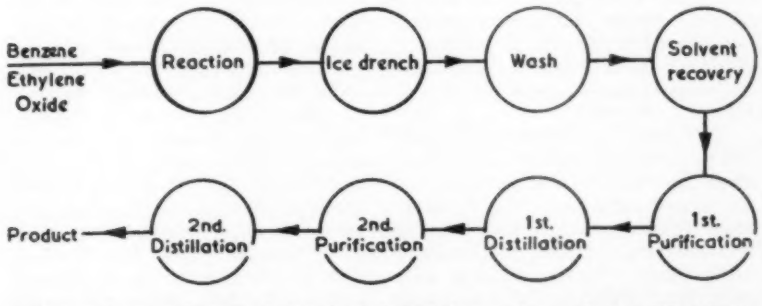
Dominating the site is a brick tower which houses chimneys and water cooling equipment. This arrangement is æsthetically more satisfactory than the usual individual chimneys and exemplifies the care taken to make the factory suit its surroundings. Another feature is the placing of pipework in underground ducts. This is practical as well as tidy because it allows the unobstructed movement of drums and tanks. The great variety of raw materials used and products made involves the use of hundreds of steel drums and their handling and storage require great care to conserve space and ensure safety. Acids, alkalis and fuel oil are delivered in bulk and stored in a tank farm consisting of seven tanks ranging up to 5,000 gal. in size. The ratio of raw materials to finished products is of the order of 5 : 1.



The aerosol laboratory where perfumes for pressure dispensed products are developed. The aerosol filling unit is on the left.

The first in the block of three new buildings is supervised by Mr. L. Cooper. It contains on one side the cyclamen aldehyde and on the other the phenyl ethyl alcohol plant. Hitherto, Givaudan have imported cyclamen aldehyde, but now the new plant is in commission enough will be made to render imports unnecessary. The initial stage is completed in one of the older plants and the next five stages, leading to crude cyclamen aldehyde, are done in the new building. The plant consists of copper, lead-lined, glass-lined and stainless steel vessels ranging in size from 1,000 gal. downwards. It is three-quarters automatically controlled. Conditions of feed, flow, pressure, temperature and time are pre-set and some stages go on for 24 hrs. One stage takes place in a pressure catalytic plant. The conversion of benzene to crude cyclamen aldehyde takes about a week. After filtration the crude material goes to the distillation section, where it is fractionated. Cyclamen aldehyde Extra L.G. with its high aldehyde content and fine odour is useful in such florals as lily-of-the-valley and cyclamen.

Phenyl ethyl alcohol is made in tonnage quantities at Whyteleafe. Initially benzene and ethylene oxide undergo a Friedel-Crafts reaction requiring large quantities of brine coolant and, in the second stage, cooling by slush ice. The plant is heavily susceptible to corrosion, and resistant metals such as lead, high-nickel alloy and stainless steel are used extensively.

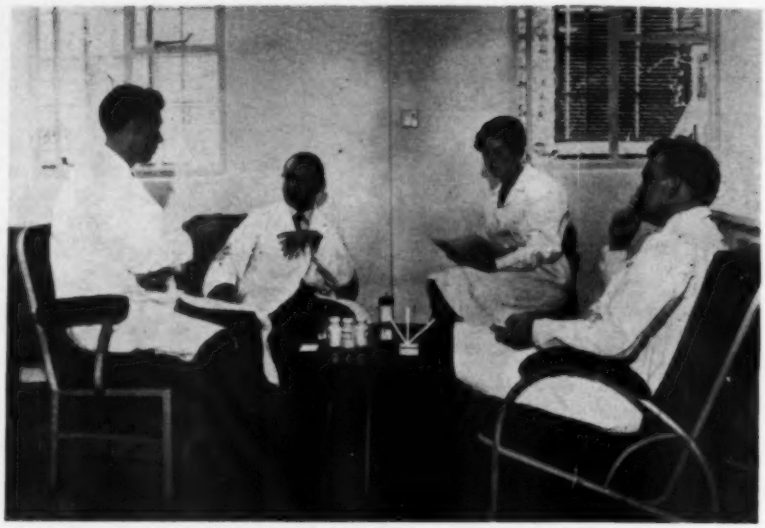


Stages in the manufacture of phenyl ethyl alcohol, a major product at Whyteleafe.

Distillation hall

The second new building is the distillation hall. Sixteen large stills, several with magnetically operated reflux heads, provide a wide and flexible range of distillation conditions to suit the many requirements of the products handled. The lower floor of the building carries all the services, including three degrees of vacuum, air, nitrogen, water and steam. The stills are charged and discharged from the basement. The upper floor, with its array of gleaming stills and fractionating columns, its glass walls and pastel decoration, is the showpiece of the factory. Detailed records of every stage of every distillation are kept,

and when it is realised that some of the products pass through as many as six stages some idea is given of the meticulous care and supervision involved. Samples of each fraction are analysed on the spot for in this business time is money and failure to alter process conditions at the right time can ruin hundreds of pounds' worth of material. The operators are highly skilled in their art and they work under the strict eye of the distillation manager, Mr. H. F. L. Lamberth. Ranged along the side of the hall are fraction tables with stainless steel tops gently sloping to central gutters to catch any material accidentally spilled from a carboy. Although the plant is semi-automatic, distillation is very much an art, and there is no quality control better than the sensitive nose of the perfumer.



Conference in the new technical service laboratory. Mr. D. P. Stagg, the perfumer (left), talks to the technical director, Dr. V. Klein. Mr. R. E. Eckton, head of the technical service department is on the right.

The latest building

The third and largest of the new buildings houses universal plant for the manufacture of synthetic aromatics and the processing of natural material such as lemongrass, bois de rose, geranium and vetiver oils. There are eight complete units on one side of the building and six of up to 1,500 gal. capacity on the other side. There are hydrogenators, high temperature reactors and a solvent recovery unit with a column passing through all floors. Each unit has a large auxiliary tank in the basement for such operations as washing, neutralising and solvent recovery. This saves time and avoids having to use a valuable reactor for relatively simple though essential operations. All units are interpiped, thus reducing handling to a minimum, and they are equipped for stirring, heating, cooling, distillation under pressure or vacuum. The interior stirrers are driven by oil turbines and an infinitely variable range of speeds is available, a facility of great value in this type of work. Cooling of vapours from the stills is done in tubular heat exchangers in combination with novel coil condensers. The coil is fitted inside a cylindrical vessel with a hollow centre; this reduces considerably the amount of water required and increases the thermal gradient and the overall heat transfer. The saving in weight is particularly important because the condensers are suspended above the reaction vessels.

Molecular distillation is used for heat-sensitive materials such as vetiver derivatives. These units are of a design patented by Givaudan. The liquid to be distilled is carried between crescent-shaped water-cooled condensers by a series of rotating discs under a vacuum of the order of 5 to 10 μ and this, of course, enables extremely low boiling points to be achieved.

As in the other buildings, all units are substantially equipped with automatic controls and again the switchgear is sited outside the flameproof area.

In the sub-basement of this building is the effluent plant. All waste liquors from the whole factory are collected in a 50-ton timber vat and then go to a wooden settling tank where oils and solvents are separated. The *p*H is continuously monitored and this actuates the supply of milk of lime which is added to achieve a *p*H around 7 before discharge to the public sewers. The milk of lime is made automatically from a reservoir of lime powder and water.

Pilot scale production and auxiliary services

The smaller and older buildings at Whyteleafe are used for small-scale production, development and auxiliary services. The development laboratory is used for trying out new processes on a laboratory scale, and it is equipped with miniature versions of full-scale plant, including fractionating columns, autoclaves, pressure hydrogenation plant and reactors. All processes are thoroughly studied there before being initiated in the factory.

Small-scale production is carried out in a pilot plant fully equipped with universal reactors in various metals and glass fractionating stills of 50 to 100 litres capacity. Besides being used for small batches it enables processes to be scaled up. Another building houses a useful plant for crystallisation, solvent recovery, filtration, centrifuging, drying, etc. Here, for instance, the first stage of cyclamen aldehyde manufacture is carried out.

In the control and analytical laboratory, raw materials are examined, processes are controlled and finished products are assayed. It is equipped with instruments for the determination of esters, alcohols, aldehydes, etc., by polarimetry, refractometry, spectrometry and gas chromotography, etc.

Finally there is the boiler house, with oil-fired boilers capable of raising about 20 million B.Th.U.s per hr.

A factory engaged in the highly individual and exacting business of large-scale aromatics manufacture is a fascinating study of science linked with art. Any chemist skilled in fine chemical manufacture can make aromatic chemicals that conform to structural formulæ. But this is where science gives way to art, for to achieve the right smell requires the skill of decades of training.

NEW RAW MATERIALS
for Cosmetics and Perfumery

By V. Vasic, Ch.E.

During the past decade cosmetic products have been strikingly improved in quality and properties. This has been achieved by the introduction of new raw materials either of improved quality or possessing new properties. Many cosmetic products on the market today could not have been made without these new raw materials. It is impossible to mention in one article all recently developed cosmetic and perfumery materials, but a wide selection of outstanding newcomers is reviewed by Mr. Vasic.

Cosmetic materials

Surface active agents

NEW agents have been developed possessing interesting properties and offering many possibilities in the compounding of cosmetics.

Amphionics and *Ambiterics* are two series of new ampholytic surface active agents from Glovers (Chemicals) Ltd. *Amphionics* are derivatives of long chain amino acids. *Ambiterics* are long chain substituted betaines or internal quaternary ammonium compounds. These surface active agents are recommended for formulation of ointment and cream bases because of increased compatibility with active ingredients and ability to change emulsions from the anion to cation active state. Owing to high resistance to hard water and compatibility with bactericides, they are potentially useful as additives in shampoos and they are excellent for perfume solubilisation because of high solubilising power and compatibility.

Desil is a new ampholytic surface active agent by Sipon Products Ltd. It exhibits both anionic and cationic effects and thus combines certain characteristics of soap and of quaternary ammonium compounds. It is a powerful bactericide which is highly active against many Gram-positive and Gram-negative organisms. It is recommended for use primarily as a germicide-detergent in medicated shampoos, cosmetics, etc., and as an active ingredient in ointments, soap, barrier creams, etc. It acts as a preservative in all types of cream, even in the presence of non-ionic surface active agents and it can be used as an emulsifying agent. Its unique property is that an anionic emulsion can be converted to a cationic emulsion by varying the *p*H.

Miranol M Series (Cyclo Chemicals Ltd.) are amphoteric surface active agents, some of which differ primarily in their fatty acid radical and others which are chemically modified. *Miranol* M series are ethylene cycloimido, 1-alkyl (fatty acid), 2-hydroxy ethylene sodium alcoholate, methylene sodium carboxylate. The derivatives of coconut, lauric, capric and stearic fatty acids are now available. The latest addition to the series is the salt-free equivalents to some of the foregoing. *Miranols* are recommended for hand cleansers, liquid bubble baths, shampoos, medicated shampoos, germicidal shampoos, cream hair rinses, etc. They possess high tolerance for alkalies, acids and electrolytes, and do not irritate the skin and eyes. Combined with other normally irritating surface active agents, they will increase the viscosity and materially reduce or even eliminate irritation.

Emulsifying agents

Avitex ML is a particularly effective new cationic emulsifying agent. Though it is especially effective for w/o emulsions, it can also be used to prepare stable o/w emulsions by blending it with more hydrophilic non-ionic or cationic emulsifying agents. In small concentrations *Avitex* ML prevents the extremely dry feel that is often characteristic of preparations containing high concentrations of stearic acid. It also reduces the tendency to "roll out" upon rubbing such products on the skin. It is recommended for creams and baby and skin lotions.

Emulsogen KOG (Industrial Dyestuffs Ltd.) is a non-ionic emulsifier for the production of paste-like cosmetic water-in-oil emulsions. It is the oleic ester of an ether alcohol prepared from natural raw materials. It is especially suitable for the preparation of skin, sport and protective creams.

Hostaphat emulsifiers (Industrial Dyestuffs) are organic phosphorus compounds in which substances from the aliphatic series are combined with *ortho*phosphoric acid either directly or else by means of an ethylene oxide linkage. The chemical structure of these emulsifiers reveals a similarity between them and the natural, phosphorus-containing lipoids which, like lecithin and cephalin, are ingredients of the fat of the skin. For this reason the *Hostaphats* are highly compatible with the skin and its moisture. They can be used for the preparation of all emulsion cosmetics.

Hostapons are condensation products used as foaming and cleansing agents in the preparation of shampoos, toothpastes and foam setting and cold waving preparations.

Dupanol XL is a new concept in shampoo surface active technology. It is a pseudo-amphoteric product

because its complex structure contains two hydrophilic sites, one of which is an anionic sulphate structure while the other is amphoteric. It has exceptional foaming power and substantivity to hair and skin with the ability to provide a pleasant "feel." Even when used full strength it will not dry out or degrease hair and skin. It is also compatible with soap, which suggests its use in bubble bath preparations.

Suprol CMT (Sipon) is a new synthetic detergent which has been specially developed to enable manufacturers to produce shampoos, bubble bath preparations, household and industrial cleaners or any detergent preparation where absence of irritation is particularly important.

Marchon Products' highly purified dodecyl benzene sodium sulphonates are now available under the trade names of *Nansa* SS and SB. The alkylate used for the manufacture of the *Nansa* SS is a straight chain type and is specially selected for liquid formulation work on account of its improved solubility. The alkylate used for the *Nansa* SB is a normal branched chain tetra propylene polymer. A range of new or improved quality surface active agents for shampoos, cleansing gels and oils, detergent creams, cosmetic creams, foam stabilisation and hair gels is also available from Lankro Chemicals Ltd.

Soap additives

New additives to toilet soaps, particularly *Loramine* MY.228 and *Loramine* IPL.203 (Dutton and Reinisch), are very interesting products. They are highly refined fatty acyl monoalkylolamides of suitable melting point and based largely on myristic acid derivatives. When used in toilet soap they fix the perfume strongly. In addition they are substantive to the skin and thus confer a protective coating on it. They are also useful in synthetic detergent preparations for their foam stabilisation, skin protective and detergency boosting effects. They are useful in cosmetic creams, where in addition to their dermatological effects they stabilise the emulsions as well as enabling substantial percentages of water to be incorporated into the creams and in many forms of emulsions.

Sorbester S.18 and S.218 are non-ionic sucrose esters of stearic acid. They are excellent o/w emulsifiers, are non-toxic and non-irritating.

Teepol 514 (Shell Chemicals) is a neutral, anionic detergent and surface active agent and *Teepol* BD.34 is a neutral mixture of anionic and nonionic surface active agents. They are compatible with all anionic materials and with water-soluble non-ionic products. They are not compatible with cationic materials.

Nonidex P.40 and P.42 (Shell) are neutral non-ionic detergents compatible with anionic, cationic, or other non-ionic materials. They are ethylene oxide/octyl phenol condensates and are attractive emulsifiers and very good wetting agents.

Cream bases

Amphocerin K (Little and Co.) is a base for ointments and creams of the w/o type. It is based on the principle of activity of a novel combination of high molecular fatty alcohol and wax ester emulsifiers of animal origin which are related to the functional fatty substances built up physiologically by the skin. It is free from wool fat and contains only minor quantities of hydrocarbons in a proportion particularly favourable to emulsification. Cosmetic creams prepared with *Amphocerin* K melt easily when applied. Such preparations have excellent adhesion without becoming sticky or causing concentration of heat on the skin. The relatively low hydrocarbon content makes *Amphocerin* K a particularly valuable cream foundation in the sense of the modern conception of dermatologically applied cosmetics.

Amphocerin E is an emulsifier of the w/o type and embodies the emulsifying principle of *Amphocerin* K. It is a biological mixture of high molecular fatty alcohols and wax esters of animal origin which are related to the functional fatty substances built up physiologically by the skin. It is free from wool fat and hydrocarbons. With it creams free from petroleum jelly and hydrocarbons can be prepared. Creams and emulsions manufactured with *Amphocerin* E also have the advantage of melting easily after application to the skin and their penetrating power is increased and accelerated.

Lanbritol Wax N.21 (Ronsheim and Moore) is a non-ionic, self-emulsifying wax, producing stable o/w emulsions. The product was developed for use with cationic materials and polyvalent metal salts where anionics are contra-indicated. Thin emulsions varying from the consistency of a lotion to that of a just pourable cream are normally quite difficult to make in a stable form. With this wax very stable thin emulsions are easily made.

New brands of *Estax* and *Ester* and other surface active agents with interesting properties for cosmetic industries are now available.

Lanolin derivatives

New or improved quality lanolin modifications and derivatives eliminating undesirable properties of lanolin are available.

Croda's *Solan* is a water-soluble lanolin, possessing the characteristic and beneficial emollient properties of lanolin, and acting as a non-ionic surface active agent. It gives clear solutions in water at high concentrations. It is not alcohol soluble and recently a modification known as *Solan* AS which is soluble in both alcohol and water has been introduced.

Westbrook is another brand of water soluble lanolin. It is a derivative of superfine B.P. quality lanolin produced by a condensation reaction with ethylene oxide. It is completely soluble in water in all concentrations. Water-soluble lanolin does not have the outstanding emollient characteristics of ordinary lanolin, but has some degree of emolliency. It can be blended in soaps without the pronounced foam-depressing action of ordinary lanolin. When used correctly water soluble lanolin has good emulsifying powers, forming o/w emulsions. It is a very useful auxiliary emulsifying agent.

Fluilan liquid lanolin is similar in odour and characteristics to ordinary solid lanolin and retains all properties of this material, without having "stickiness" and "drag" upon application to the skin. Another disadvantage of normal lanolin is that mineral oil solutions of it are not clear, as a substantial portion of the lanolin initially dissolved is usually thrown out of solution on cooling. These difficulties are eliminated by *Fluilan*.

Another product of this type is Liquid Lanolin "60" (Westbrook). It is a pure anhydrous lanolin in liquid form, wholly derived from pharmaceutical lanolin and containing no solvents, diluents or adulterants. It can be easily applied to and absorbed by the skin without

dragging or sticking. It is valuable in liquid emulsions or "milks" such as cleansing milks, complexion milks and baby creams, where a low viscosity is desirable.

Lanethyl is a special lanolin fractionation product totally soluble in ethyl alcohol. It is particularly suitable for use as an alcohol-soluble plasticiser in hair wave setting preparations and lacquers, acting itself as a temporary fixative, and at the same time as a softener for rigid film-forming materials such as poly-vinylpyrrolidone, ethyl cellulose, shellac, etc. It combines extremely well with aerosol propellants such as Arcton, Freon and Genetron.

Super Hartolan is a mixture of wool wax alcohols obtained by the total saponification of wool fat followed by the extraction and purification of the unsaponifiable portion. It is rich in cholesterol and other non-ionic surface active agents useful as emulsifying agents for producing w/o emulsions. Wool wax alcohols can advantageously replace lanolin in a large number of toilet preparations, the product having the advantage of less odour, less drag and stickiness, and having a better colour than would result from the use of lanolin. Hartolan is particularly valuable for the production of emulsified creams of the water-in-oil type.

Fluicol is a segregation product of wool wax alcohols in an inert, neutral, odourless solvent. It makes available in a liquid form the well-known emollient and emulsifying properties of lanolin and wool wax alcohols. It functions both as an emulsifier for w/o emulsions and also as a stabiliser of the o/w type. It is particularly indicated in anti-sunburn creams and oils, beauty milks, cleansing creams, shaving creams, hair creams and as a softening agent and emollient, in oils and hair tonics, night creams, biological creams and hormone products, barrier creams and oils.

Under the general label of *Special Extrapones* (Bruce Starke) the concentrates of the active substances of plants and their complexes have been introduced. For the preservation and care of healthy skin, as well as for treating defects such as deterioration due to ageing these preparations are of a special interest. Plant active principle complexes recommended for the care of hair are: *Extrapone*, *Arkin Special* and *Extrapone 5 Special*.

Fatty acids derivatives

Cetiol V (Little and Co.) is an oily substance consisting of oleic-acid esters of liquid fatty alcohols. It is related to the biological skin fats, is non-irritant and compatible with the skin. Because of its high fluidity and good wetting properties it is completely and rapidly absorbed and is an excellent solvent for lipoid soluble active agents. It is not liable to become rancid because of its firm ester bond. It is suitable for preparation of cosmetic skin oils, and in conjunction with emulsifying agents it is a superfatting constituent for creams and liquid emulsions.

Eutanol G (Little and Co.) is a liquid, saturated fatty alcohol, mainly octyldodecanol. It is non-irritant and compatible with the skin. Due to its excellent dissolving properties and easy penetration through the epidermis it is an excellent dermatological vehicle for lipoid soluble active agents. It is almost odourless and can be easily perfumed. It serves as a base for oily preparations such as sun-tan oils, and as a superfatting constituent for cosmetic creams and emulsions.

The so-called essential fatty acids, sometimes referred to in the past as "Vitamin F," are causing some interest because of the therapeutic properties attributed to them, and also because their esters, *e.g.* isopropyl linoleate, impart certain desirable properties to creams and lotions. Isopropyl linoleate is a mixture of the isopropyl esters of linolenic and linoleic acids. Tests have shown that creams in which this product is incorporated have a beneficial effect on skin that is dry, chapped or fissured.

The quality of acetoglycerides has been improved both in taste and odour. They are particularly suitable for formulating products which contain a high proportion of fatty material because they reduce the "oily" feel normally associated with such products. Applications include cosmetic creams and lotions, lipsticks, hair preparations, etc.

Bisomel (Distillers Co. Ltd.) isopropyl palmitate, isopropyl stearate and isopropyl palmitate-stearate are esters which are useful emollients and lubricants for incorporation in day creams, powder creams, shaving creams and lotions, finding uses analogous to those of isopropyl myristate in the formulation of thicker and more viscous preparations. They are effective solvent media for lanolin and are used to an advantage in hand creams and hair preparations. They are also useful superfatting agents and are particularly effective in all types of aerosol formulations.

A high quality oleyl alcohol has been introduced; it is water white and odourless.

Propylene glycol mono myristate is of particular interest in lipstick formulation as a partial solvent for eosin, and also as a blending agent for the waxes and propylene glycol used in these formulations. It is also of value in creams and lotions.

Preservatives and bactericides

Monomethylol dimethyl hydantoin is an odourless formaldehyde donor which is used as a protein insolubiliser, bactericide and mould preventive. It is particularly recommended for creams and shampoos.

Undecylinic monoethanolamide (Dutton and Reinisch) is another interesting product. It has excellent bactericidal and fungicidal properties and, far from being a skin irritant, possesses good dermatological properties.

With *Embanox* (May and Baker Ltd.) butylated hydroxyanisole, a derivative of hydroquinone, oxidative rancidity in animal fats and oils and in vegetable oils can be effectively retarded. The recently introduced Antioxidant in Food Regulations 1958 authorised the use of *Embanox* in edible oils and fats (whether hardened or not) and in essential oils, including flavouring constituents, isolates and concentrates.

Detamide 95 (Honeywell-Atlas) is a new insect repellent. It is diethyl-*m*-toluamide (containing 95% pure meta isomer). It can be applied undiluted to the normal skin and will not affect most clothing. It forms a thin stable film highly resistant to perspiration and is effective in cosmetic creams and lotions and in aerosols even after considerable dilution.

Pearl essence

A specially refined natural fish silver essence is available at different concentrations and in various media, depending upon its ultimate use. *Crec-O-Pearl* essence dispersed in nitrocellulose with very low settling qualities and an excellent glossy finish is designed for use in the

manufacture of pearly nail varnishes.

The recent popularity of pearly lipsticks, eye make-up, mascara, etc., has been responsible for the development of another grade, *i.e.* Natural Pearl Essence dispersed in refined castor oil or in other suitable media.

Silicones

Silicone fluids are being increasingly used in cosmetics because they are non-sensitising, non-irritating, water-repellent and protective. Included in their present and potential applications are: water-repellent bases for hand creams and skin lotions, bases for sun-tan lotions, non-melting bases for cosmetics and creams for film, stage and television use, non-rancidifying oils in hair preparations, water-repellent and smear-resistant additives in lipstick and chap-preventives, moisture-repellents for non-caking face powders, etc.

Powders

Satinex is a very fine white powder of high specific volume, very fine texture and very light to the touch. Products in which it is used have extremely good covering power and adhesive properties without the dense heavily powdered look normally associated with such properties.

Wilkinite 625 (Bush, Beach and Gent Ltd.) is a new grade of a high quality genuine Wyoming bentonite which is practically grit free.

Aerosil (Bush, Beach and Gent) is a highly dispersed pure silicon dioxide of very fine particle size which forms more or less transparent gels in aqueous suspension. The thickening effect of *Aerosil*, combined with its chemical purity, are two factors which make it a suitable auxiliary in the preparation of cosmetic products. It serves as a thickening agent for creams and as a stabiliser in emulsions. In toothpastes, apart from its thixotropic properties, it offers the following advantages: it has no harmful effect on the tooth enamel since it is non-abrasive and only polishes, it stabilises and loosens the texture of the paste and at the same time acts as carrier for the active substances, it permits an extremely high water content at normal consistency, the volume of the paste is markedly increased and the effect of the foaming agent improved. *Aerosil* is also recommended for making powders free flowing. A special new grade known as COK.99 is now available for creating a high degree of thixotropy in water dispersions.

Many different aluminium salts in the purest form and suitable for formulating anti-perspirants and deodorants are available, *e.g.* aluminium chlorhydrate, aluminium chlorhydroxy-lactate, basic aluminium sulphamate, aluminium phenolsulphonate, etc. Aluminium salt complexes such as *Chlorhydrols* and *Chloracel* are available for the same purpose.

Resins and cellulose derivatives

New synthetic resins and improved cellulose derivatives offer many advantages in cosmetic formulations.

Dimethyl hydantoin formaldehyde resin—a new synthetic resin—has a number of unusual properties which may interest the cosmetic industry. It is water-white, water- and alcohol-soluble and almost one-third the cost of polyvinyl pyrrolidone. It offers many advantages in the formulation of all types of hair lacquers, where it may be used either on its own or in conjunction with shellac, polyvinyl acetate, ethyl cellulose, or polyvinyl pyrrolidone. Other uses for which D.M.H.F. resin may be worth considering include hair sprays, hair setting lotions, and as a bonding agent for cake and compressed powder make-up, bath cubes, etc.

Polyox water-soluble resins (Union Carbide) are polymers of ethylene oxide with molecular weights ranging from several hundred thousands to five millions. They are available in four viscosity grades. Truly plastic, yet water-soluble, they provide some outstanding advantages. Excellent film-forming ability and suspending power have been demonstrated by *Polyox* resins in aerosol hair sprays. They enhance the film-forming, stability and feel of face creams, hand creams, shaving preparations and shampoos. In creams and lotions based on soap, such as vanishing creams, they depress foam and thereby make manufacture and filling easier. They also reduce the tendency to "soap up" during application. They are generally more compatible with a wide range of toothpaste compositions than other synthetic gums. In anti-perspirant creams and lotions they are suggested for viscosity control, in cold-wave lotions as thickeners and in compressed face powders and pigmented foundation lotions as binders. In cosmetic sticks—these include anti-perspirant sticks, cake mascara and cake make-up—*Polyox* resins improve lubricating and reduce the soaping of products containing soap and water. They are of special interest for formulation of calamine and hand protective lotions.

Another new water-soluble resin, *Aquaresin* (glycol bori-borate), is suggested for "smoothing" skin and preventing chapping, and for hair setting preparations.

Celacol water-soluble ethers of cellulose (British Celanese Ltd.) can be employed with advantage in the manufacture of cosmetic creams and lotions of outstanding smoothness: hand creams, barrier creams, beauty milks, hair creams, depilatories, deodorants, ointments, cleansing milks, hand lotions, baby lotions and sunburn lotions. It has special advantages in the manufacture of toothpaste. High viscosity grades of *Celacol* have been found very suitable for thickening synthetic detergent lotions and are being used in thickening soapless shampoos.

Courlose (British Celanese) is sodium carboxymethyl cellulose of many different grades. Where film-forming, thickening and stabilising powers are of value, the salt-free grades are used, *e.g.* in the preparation of oil-resistant barrier creams, toothpastes, hand creams, shampoos, wave setting preparations and other cosmetics.

Lipstick base

Cetilonate represents the latest fatty base for lipstick, creams, soaps, etc. It is a balanced and standardised mixture of fatty alcohols, such as oleic, myristic, palmitic, cetylic and stearic in acetylated form. It is not susceptible to oxidation or thermal changes. It will give to creams, and particularly to lipsticks and other types of cosmetics, a very attractive appearance, silky smooth texture, and stability to temperature changes. *Cetilonate* is non-sticky, non-greasy, and readily absorbed by the skin. This latter feature makes it of particular interest as a base for medicated creams, when the introduction of hormones, vitamins or other pharmaceutical specialities is desired.

Perfume materials

Alongside a process reorganisation which has resulted in an *alpha* amyl cinnamic aldehyde of the highest purity yet obtained commercially, W. J. Bush and Co. Ltd. have introduced the regular manufacture of *alpha*-hexyl cinnamic aldehyde. Another interesting variation is the development of the dimethyl acetal of iso-octyl aldehyde with its rosy over-tones allied to the more fruity character of the normal octyl compound. In the cosmetic field, the company's main developments have been concentrated on new formulæ for cosmetic aerosols using their own aerosol filling plant with special emphasis on hair lacquers and dentifrice formulations.

Acetate P.A., a pure chemical body recently developed by Givaudan and Co. Ltd., possesses a fruity-pineapple, warm musk-like character. It offers most interesting effects in perfume formulations of the lilac, muguet, jasmin and other floral types. It has remarkable coverage and odour stability and does not cause discoloration. In a perfume formulation it adds lift, freshness and trueness of character to certain oils, sometimes lost in compositions, and leads to perfume stability and fixation.

Florals

Lilial (Givaudan) is an aldehyde. Its fresh and flowery, powerful and tenacious note is remarkably diffusive. Creams, soaps, powders and other cosmetics containing *Lilial*, when exposed for several months to air and light, do not alter or discolour and the odour remains fresh and pleasant. Lilial does not irritate or sensitise the skin and is particularly suitable for floral compositions: muguet, lilac, cyclamen, linden, violet, rose, jasmin, honeysuckle, etc. It blends with aldehydic notes and with modern fantasy compositions on woody, amber or mossy bases, giving them roundness and smoothness.

Parmiron (Moorgate Produce and Chemical Co. Ltd.) is a new aromatic combining an ether and a ketone. Apart from the lasting odour of the expensive *alpha*-methylionone it possesses a very fresh top note. It does not paralyse the olfactory nerves, an inconvenient characteristic of ionones and methyl ionones. It is an economic replacement for orris absolute and methyl ionone.

Aceto-ionone is a new and interesting chemical with good fixative properties. Excellent both in floral and exotic perfumes. Its woody and green tonality is an appreciated component in both handkerchief and soap perfumes.

Synthanel is a completely new pure chemical from May and Baker Ltd. It has a powerful, very persistent gardenia-hyacinth odour (with the emphasis of gardenia) and bears a strong resemblance to styrallyl acetate (phenyl methyl carbonyl acetate) but is more persistent. A mixture of Synthanel with styrallyl acetate will frequently be found to give better results than either product alone. In colognes and other citrus type perfumes it enhances the citrus odour, giving the impression of a higher essential oil content than is actually present. Small amounts added to aldehydic bouquets and fancy floral type compositions also enhance the citrus notes.

Petalone is a new floral base and modifier from Soflor Ltd. It has a fine note reminiscent of fresh dewy roses—an effect usually difficult to obtain. It can be used in any compound where a natural fresh floral note is required. It is stable in soap, non-discolouring and non-irritant.

Alpha-isopropyl Muguetton (Moorgate) is a ketone with sweet flowery and very round odour without harshness. This odour, which recalls lilac and lily-of-the-valley, is very penetrating and is an excellent starting point for flowery compounds. Its high stability in soap permits its use in massive doses.

Mugoflor (P. T. Petley and Co. Ltd.) is a body with an odour reminiscent of lily-of-the-valley and possesses the green note of wild lily-of-the-valley just in bloom. It is stable in soap, non-irritating to the skin and does not discolor. It is an excellent base for lily-of-the-valley compounds for cosmetics and soaps, and is also valuable for all compounds normally built up with hydroxycitronellal. It is an excellent starting product for odours such as cyclamen, honeysuckle, lilac, linden, etc., and it can be highly recommended for soap.

Convariax 58063 (Jacobson Van Den Berg) is a recently introduced compound with a striking, fresh green effect which recalls certain subtle notes of lily-of-the-valley, and is particularly indicated if a harsh leaf green shading is desired.

Prunaldehyde is an entirely new speciality for use in perfume compounding. It has a fruity tonality recalling plums, with an agreeable and slight spirituous top note. Although fruity in character, it is not a flavour. The fruity top note is especially recommended for lipstick perfumes.

In the blends which require an intense green leafy character with a maximum amount of top note, *Adoxal* (Givaudan) is an excellent addition. It is stable in soap and detergents with no evidence of discoloration.

Iso-Bergamate "Dragoco" (Bruce Starke and Co. Ltd.) is the ester of a new terpene alcohol with a soft, fruity fragrance and a delicate woody background. It resembles the flowery mild basic fragrance of the terpeneless bergamot oil which is masked in the original oil by the harsh citrus component. The fine woody background of this bergamot aromatic is useful in known perfume compounds and will suggest to the creative perfumer many new motifs for perfumes of the classical modern type.

Jasminoflor (Bruce Starke) is a new product—a reproduction of the genuine jasmin flower oil. Its character lies between the radiant flowery bouquet of jasmin ether and the soft, caressing fragrance of jasmin benzene absolute. It has the clear, typical, true-to-nature scent of jasmin absolute and possesses outstanding fixative value with twice the tenacity of the natural flower oil. It is non-irritating and stable in alkalies.

Gerandalol was developed as an "extender" for geranium oil. Its value will be appreciated when it is blended with the natural oil, being designed to strengthen and fortify the predominant characteristics of geranium.

Corps 20 is an excellent new base for geranium compounds, from Arthol Ltd. It is extremely stable in soaps and detergents.

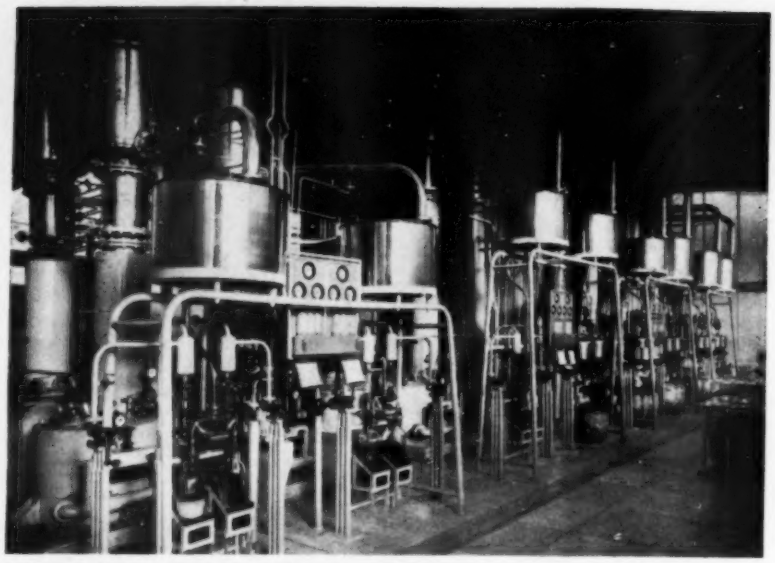
Coniferol (P. T. Petley) is a highly concentrated factor of the natural coniferous oils, found in pine, silver fir and Scotch fir oils. It is free from synthetic additions. It has many applications, *e.g.* strengthening and fixing natural and artificial pine and fir oils, air conditioning

preparations, aerosols, soap, floor polishes, disinfectants, etc.

Citropal (Bruce Starke) is a synthetic terpeneless lemon oil with the full, pure odour of natural terpene- and sesqui-terpeneless lemon oils in highest concentration. It is particularly recommended for colognes of predominantly light and fresh lemony character and it has many other uses.

Rectified cognac oil (Moorgate) distilled from wine lees, with a fine aromatic odour and taste, is a new product of particular interest to manufacturers of flavour compounds for the liqueur trades.

For certain speciality applications such as cosmetics the colour of floral absolutes and resinoids is undesirable. Colourless absolutes and resinoids of citrus, geranium, labdanum, lavandin, lavender, oak moss, opoponax, tonka and violet leaves have been introduced with the odour properties as close as possible to those of the original absolutes and resinoids.



The distillation hall at Givaudan's Whyteleafe factory. It contains 16 large stills, several with magnetically operated reflux heads. **(See page 395.)**

Orange blossom

Bigaradia (Bruce Starke) is a copy of the charming yet tart scent of natural orange-blossom extract oil. Its scent corresponds to that of the genuine blossom extract oil and it is fully able to replace the almost prohibitively expensive natural oil. It can be worked into compositions and treated exactly like the genuine oil.

Neroflor extra H & R (P. T. Petley) has a marked similarity in the odour to neroli oil and orange blossom, but it is also reminiscent of jasmin, gardenia, tuberose and sweet pea. It will not discolor and does not irritate the skin and it will therefore prove suitable for building up compounds for use in cosmetics. It has excellent fixing properties and can be recommended as an exceptionally fine modifier for eau-de-cologne. Neroflor savon H & R possesses the same properties as the "extra" quality, and has been evolved to meet the special needs of the soap industry.

Neroli Bigarade 133 is a fine reproduction of the natural oil. It answers a real need on account of the frequently fluctuating price of natural neroli bigarade.

Bortalia is a synthetic substitute of orange flower absolute. Its homogeneous odour gives a very natural effect, faithfully reproducing in a harmonious combination the many aspects of the odour of orange flower absolute, the deep basic tone, the fruity character and the green, somewhat harsh, top note. It permits new and interesting effects, not only in floral compositions but also in fougère or chypre, the basis of so many fashionable perfumes.

Product 54 (Givaudan) is a new definite chemical body, which has a significant value in perfume compositions, especially those for soap. It is not prone to decomposition and does not discolor. It imparts a woody-floral character, and blends and diffuses the complete compound in the product.

Vetester (Arthol) is a straight chemical which gives a woody head note to modern bouquets. It blends well with methyl ionones, vetyvenyl acetate and other aromatics of this type and is powerful when fixed in combination with other chemicals. It is stable in soap.

Lignyl acetate (Moorgate) is an ester with a woody note. It produces an excellent base for modern perfumes when combined with aldehydes.

Acetate d'amryle is a first-class fixative. Its woody and orris note, slightly less "pencil-like" and yet rounder than cedryl acetate, is making it popular as a new element when compounding fine perfumes and their corresponding soap variations.

Junox (Givaudan) is a new synthetic material possessing valuable general purpose fixative properties. Whilst its exceptional stability and low price favour its use in soaps, detergents and similar products, its performance in perfumes for other purposes should not be overlooked. Its woody nuance immediately suggests its application in compounds in the same way as vetivert, patchouli and similar natural products, and in fact excellent replacements for these oils can be achieved using up to 70% Junox. It blends excellently with most aromatic materials giving practical bases for floral notes of many types, classical and fantasy bouquets, etc.

Pelargonic acid esters are now available at reasonable price. The odour of pelargonates varies from a bright wine-like top note to greenish-rosy, earthy to wax-like. They give a remarkable natural freshness to the compounds which have been built up mainly with synthetic aromatic chemicals.

Following upon the production of a high-quality geraniol-Abrac Geraniol Standard obtained from turpentine, Abrac Nerol Standard also obtained from turpentine, has been introduced. Nerol Standard provides a new and intriguing conception of the nerol odour and highlights the versatility of a really pure product. The consistently high quality of Nerol Standard and its low price should re-awaken interest in this somewhat neglected material.

In April this year Abrac Linalyl

Acetate Standard was introduced. This material, obtained from the Glidden-Abrac turpentine process, has a particularly clean and clear note, which, whilst not lacking in strength, is free from the by-odours of linalool, geranyl and terpenyl acetate, camphor, etc., usually present in the commercial qualities of linalyl acetate.

Menthanyl acetate is a new ester with excellent perfuming properties. It has proved to be a desirable base for compounding linalyl acetate replacements and for extending this product, and for artificial oils of bergamot, petitgrain and lavender. It is stable and useful material for compounding fougère and floral bouquet-type soap perfumes.

Nopyl acetate is another replacement for linalyl acetate. It has an odour somewhat reminiscent of linalyl acetate, but with a sweeter and more full-bodied natural character. It is more stable and longer lasting than linalyl acetate in milled soap. In many instances it can be used in the same manner as linalyl acetate.

Civets and musks

Civet 58 (Bruce Starke) is a new substitute for natural civet. It contains new substances found in civet, including a new lactone, now the main component. This lactone replaces the insoluble fatty and wax-like substances of natural civet and permits good solubility in alcohol and perfume oils, thereby greatly facilitating its use.

Civette R.P. No. 2 is another new substitute for natural civet. It is completely soluble in alcohol and possesses the same strength as natural civet.

Grisambrol is a synthetic ambergris. Like natural ambergris, it possesses a velvety odour of remarkable tenacity. When incorporated in a perfume, it produces effects similar to those conferred by the natural product. Used in small proportions, an infusion of Grisambrol represents the ideal fixative for light and flowery tones. In aldehydic perfumes it blends equally well with both the top note and the residual note, and in particular with that of vanilla infusion. Used in greater quantities, it harmonises extremely well with " bitter " notes, with the odours of rose absolute, vetiver and patchouli.

It is extraordinarily difficult to find good qualities of Tonquin Musk for perfumery because of the prolonged ban imposed in China, Tibet and Indochina on the hunting of musk-deers, in order to preserve the animal population.

Muscarol Extra (Bruce Starke) is a welcome substitute for the expensive genuine Tonquin Musk and can replace it in many cases.

Musc Lacrone (Moorgate), one of the latest musc types, imparts a velvety and smooth odour, rounds off the perfume and eliminates the original harshness and crudeness of synthetic chemicals.

Tonkanoid and Resinoid Musk Tonquin Artus MM & R (Jacobson Van Den Berg) are other recently introduced substitutes for genuine Tonquin Musk. In Tonkinoid are united the refining properties of the cyclic lactones and a characteristic animal note. Resinoid Musk Tonquin Artus MM & R, a powerful and economical replacement, contains components comparable to the natural product.

Cervolide (12-oxahexadecanolide) is a macrocyclic lactone closely allied to pentadecanoide and hexadecanolide. It has a musky smell of high and lasting quality and may be used in all formulæ in which the precious musk note is indicated. It is much cheaper than other musk compounds.

Lactoscatone " Dragoco " (Bruce Starke) is a new aromatic lactone, a derivative of 1,1-dimethyloctaline with a typical fæcal note. It is the first nitrogen-free aromatic chemical with a fragrance reminiscent of skatole and, therefore, the only chemical in this classification which cannot cause discoloration when mixed with other components. Lactoscatone has a remarkable fixative power. It will intensify the fragrance of a compound to which it is added, will round out the components and will retard fading by reactivating diminishing odours.

Exaltofix is a new product of many membered carbon rings, especially created for soap perfumes. It possesses an extraordinary power of fixation and exaltation.

Tonalid (Soflor) is a new musk odorant with a refined natural musk odour. Its odour is characteristic of expensive musk, which is radiating yet tenacious, without sharp or chemical by-notes. Its performance is thus comparable to that of natural musk tincture: it enhances floral and spicy woody notes, blends aldehyde notes and tones down their sharpness. The outstanding and distinguishing feature of Tonalid (heptamethylidan methyl ketone) is strength and radiating power, equalling that of cyclopentadecanolid which is known as the most powerful and expensive of the macrocyclic musks. It is alkali and light stable.

Civet Artus No. 500 MM & R (Jacobson Van Den Berg) is an excellent replacement for the natural product, both for its fixative properties and for its odour characteristics. It is cheaper than natural civet and may be used freely in fine perfumes, cosmetics and toiletries.

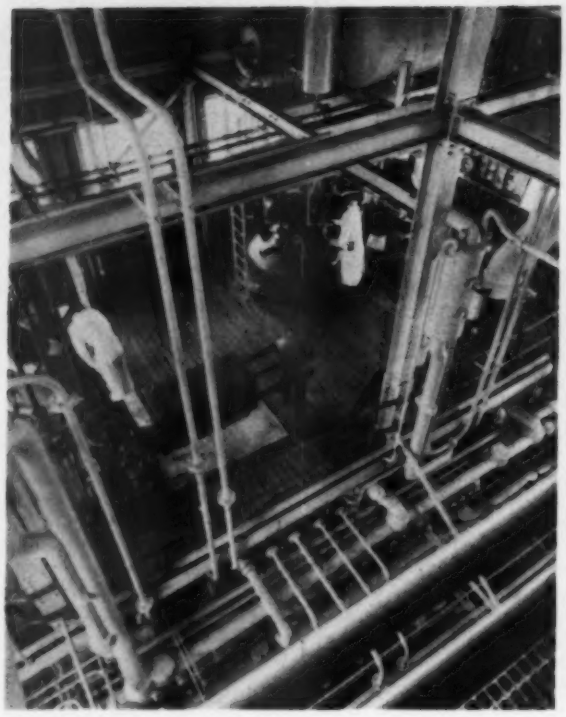
Omegalacton 605 is a new lactone with an odour strongly reminiscent of the classical macrocyclic lactones. Having extraordinary fixative and exalting properties, it is useful not only in various perfume compounds but also in fruit flavours, such as raspberry, blackcurrant, blackberry, etc. It is very stable against the action of air and light, as well as in alkaline media.

Base Vert 1959 is a popular type of " green " sophisticated perfume, a type that is now more popular than ever. Base Vert 1959 brings this popular type of perfume right up to date by retaining the original character and incorporating the skill of the modern perfumer. It is intended for " de luxe " extracts and lotions.

Hyriaflor 3 is a very modern, powerful and almost a " general purpose " perfume essence. It is worth consideration for cutting costs without sacrificing quality.

Silkaflors is a range of new six bases for the pronounced vogue for perfumes with a floral " silky " smoothness which incorporate a suggestion of sophistication and " warmth." They are economical because of their fine covering properties. They can be used in perfumes for powders, almost all types of creams, cuticle preparations, shampoos, lotions, luxury toilet soaps and other beauty preparations.

Liquid Heliotrope Dark (Standard Synthetics), a new low-priced raw material of persistent odour, has been recently produced. This Liquid Heliotrope is excellent in soaps, disinfectants and spray perfume bases for imparting a floral note. It is also useful as an industrial deodorant to cover up unpleasant odours in paints, printing inks, polishes, household cleansers, liquid soaps, etc.



Left: The biochemical pilot plant on the top floor of the organic synthesis building. The filter is used to extract mycelium from fermentation liquids. Note the wooden floor (see article). Right: Centrifuges in the organic synthesis pilot plant.

Pfizer Forge a Link Between Research and Production

£100,000 PRODUCTION DEVELOPMENT PLANT AT SANDWICH

A FURTHER step in the development of their chemical factory at Richborough, Sandwich, Kent, has been taken by Pfizer Ltd. The 80-acre site has a short history as a chemical centre. The first plant to be opened was a £2,500,000 antibiotics installation for the manufacture of Terramycin in 1955. Various chemical plants and ancillary installations were added and the next major step was the opening of a £1 million polio vaccine plant last year.

The development of Pfizer Ltd. as a basic pharmaceutical manufacturer was taken a stage further with the establishment of a research department, and now this has been linked with the production departments by production development facilities. Installed at a cost of £100,000, they are under the direction of Dr. P. G. Jones, who was formerly with Glaxo Laboratories. There are four sections:

1. A chemical development laboratory under Dr. C. A. Bartram.
2. An organic synthesis pilot plant and preparations area under Mr. A. G. Smith.
3. A biochemical pilot plant under Mr. R. M. Foster, a chemical engineer who is also responsible for general engineering and process matters within the department.
4. A fermentation development laboratory under Mr. E. J. Tridgell.

Chemical laboratory

This laboratory is a conventional organic chemical laboratory. Its purpose is to translate the ideas of the chemical research laboratory into production processes. A complete study is made of the various reactions for preparing a compound with the object of devising the most economical and convenient method of manufacturing it. Once a production route has been selected the process is transferred to the organic synthesis pilot plant.

Pilot plant

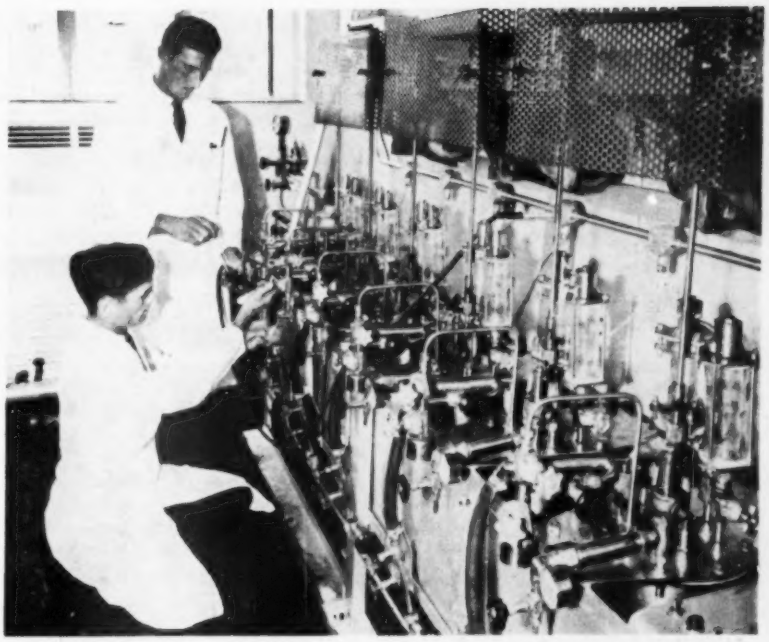
This is built on three levels, the ground floor and first floor containing mainly organic synthesis equipment plus a number of general purposes vessels of stainless steel and glass-lined construction with capacities from 20 to 100 gal. The vessels can be operated under a variety of conditions, this flexibility being achieved to a large degree by a heat transfer system employing tetra aryl silicate, which enables temperatures in the range of —15°C. to 275°C. to be readily obtained.

This system is expensive, but it is justified by the remarkable flexibility of operation which can be obtained. The area is flameproof, and this was a consideration which led to the selection of wood (greenheart) for the floors. This can be cut and drilled without the need for metal cutting tools, which introduce a fire hazard. Against this was the problem of making the floor leakproof; this has been achieved by caulking and sealing. The plant has been designed to facilitate future expansion and alteration. There is a void in the centre of the plant which houses the service lines and provides room for erecting fractionating columns, ion exchange columns, etc.

Other facilities include a wide-range vacuum service, stainless steel and rubber lined centrifuges, Sparkler filters, overhead fume extraction, and drying ovens.

Processes worked out in the chemical laboratory are run through the pilot plant and modified for full-scale manufacture.

Many calls are made on the department for intermediate batches of materials (1 to 2 kg.) which are too large for laboratory preparation and too small for the pilot plant. These are produced in the adjoining preparations area which contains a number of small glass plants which can be erected and dismantled easily. Many services are provided to give maximum flexibility. Products prepared in this section are used for initial field and clinical trials and as raw materials for further investigations.



The six 5-litre stainless steel fermenters in the fermentation development laboratory. The chemists are taking samples for assay by chromatography and other means.

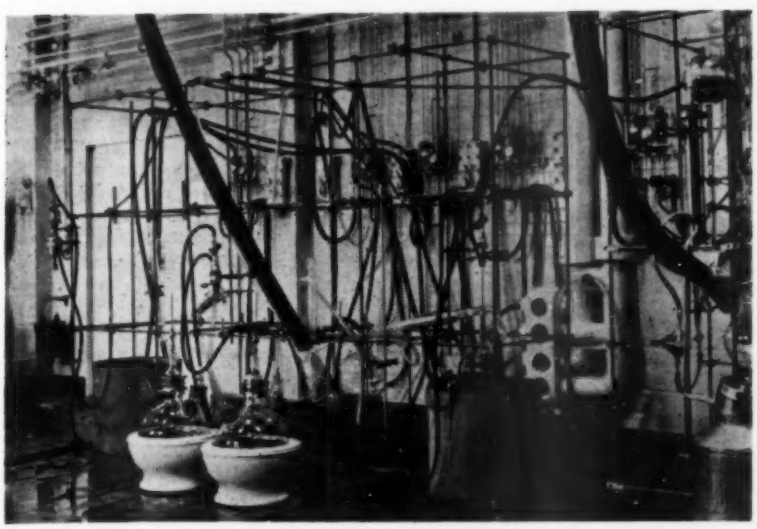
Biochemical pilot plant

This is located on the top floor of the organic synthesis pilot plant. It is equipped with stainless steel vessels able to deal with volumes up to 500 gal. Fermentation products made in the 300 gal. stainless steel tank are put through a stainless steel filter to take out the mycelium. The filtrate then goes to a 500 gal. cone-bottom extractor with a cooling coil. Solvent extraction methods are employed and the product is finally isolated by concentration of the solvent phase, addition of coagulant, etc.

Fermentation development laboratory

In this laboratory fermentation production processes are developed in a similar way to chemical processes. The main equipment is a batch of six 5-litre stainless steel fermenters with ancillary equipment. The fermenters are fitted with air supply, variable speed agitators and feed vessels for the addition of various ingredients to the fermentation process, for example anti-foam or, in the case of steroid conversions, the steroid in question. Current emphasis is on the modification of steroids by biochemical means, in particular the addition of an oxygen atom at the 11-position in hydrocortisone synthesis. The conversion is effected by an enzyme which is produced by fermentation. Paper chromatography is used to check the efficiency of the conversion.

All the equipment in the production development department is of British manufacture, and it was installed in record time to provide a department to meet the needs of a growing production programme.



The preparations area with glass plant capable of making batches up to 50 litres. Note overhead fume extraction ducts.

This year's conference, which was held at Bournemouth from September 21 to 25, followed the usual pattern with a long opening address by the chairman, a symposium session, and a number of science papers. The chairman, H. Treves Brown, chose for his address the subject of patents in pharmacy and medicine. In this report of the Conference papers by **S. J. HOPKINS, F.P.S.**, *the chairman's address, the symposium papers and 26 science papers are summarised.*

Pharmaceutical and Medical Patents

THE first patent was granted in 1449, and concerned the manufacture of coloured glass for Eton College, but patent legislation is considered to date from 1624, when the Statute of Monopolies was drawn up.[1] That Statute had an immense influence, as the economic philosophy on which it was based set a pattern for patent law that became virtually world-wide, and still has a validity today as part of the Statute is still in force. Some countries, notably Italy, no longer conform to that pattern, but changing economic pressures may eventually bring about a return to the accepted system.

The influence of economics is exemplified in our own patent history. Thus before 1919 patents were granted for new chemical substances generally. In that year the Patent and Designs Act was passed, which restricted patents to substances made by specific methods. This was done to assist the British chemical industry to meet reviving German competition, the aim being to encourage chemists to devise unpatented methods for making controlled substances. But by 1949 the attitude of the chemical industry had changed. It was now confident of its abilities, and, like the U.S.A., preferred to devote its energies to the discovery of new compounds rather than alternative synthetic methods. This change was embodied in the Patent Act of 1949, which also allowed patents to be granted for foods and medicines.

Patents and employees

The ownership of patents as between employer and employee has sometimes caused difficulties. In cases of dispute, the Comptroller of Patents now has the power to adjudicate, whereas before 1949 it could be settled only by the expensive process of High Court action. A more serious difficulty may arise when the invention is the discovery of a team. Here the position is less clear, as it might be argued than an invention, being a mental process, cannot be made by a team. In future legislation it might be desirable to eliminate this forensic pitfall in view of modern research methods.

Infringements

Infringement of chemical patents is relatively uncommon, and the usual defence is that the patent is invalid. It is of interest to note that in 72% of the infringement actions brought between 1919 and 1949, the patentee was unsuccessful in asserting his claim. Of greater immediate interest is the fact that in this country it is not an infringement to sell an unpatented article for subsequent use to make a patented product, and it may well be impracticable to control the final user of the product. In America the seller would be considered a contributory infringer. A hospital pharmacist who manufactures a copy of a patented medicament may be sheltered in a similar way.

Medical patents

The subject of medical patents generally has aroused considerable controversy in the past, as the medical profession held that private gain should not derive from such patents. The reasons behind this were more emotional than logical, and were due in part to the fact that most medical patents owe much to earlier workers, and the patentee was perhaps the lucky one among many investigators.

The practical outcome of this attitude was that British medical inventions were presented as a free gift to less high-minded manufacturers abroad. The discovery and subsequent exploitation of penicillin finally brought about a change in the attitude of the medical profession, which at last realised that unless a new drug was protected for a time, the firm concerned would be unable to recover its research expenditure, and thus become unable to undertake further research.

Italian patents

Paradoxically, Italy has the distinction of being the only major manufacturing country in Europe that does not grant patents for medicines or processes, and yet has a flourishing pharmaceutical industry. This absence of patents has enabled Italian manufacturers to make many valuable drugs discovered elsewhere. The costs of research have thus been evaded, and this has played no small part in the growth of the post-war Italian pharmaceutical output. At the same time, an Italian manufacturer enjoys the patent protection of other countries for his own inventions. This one-sided scheme has aroused considerable resentment, but, as it is due to the economic environment, it is unlikely to change until new factors come into play. When the Italian pharmaceutical manufacturers become more interested in originating their own products, the question of protection in the home market will acquire more than academic interest, and some reciprocal patent arrangements may become an economic necessity.

American patents

In America the approach is more logical, and both new drugs and processes can be patented. Any criticism that such a degree of protection might confer some monopolistic power on the patentee is answered by the intense economic pressure of the American commercial system. This has proved a remarkable stimulus to the drug industry, and the flow of new drugs

demonstrates the validity of the system.

Compulsory licences

In this country the possible dangers of monopoly are checked by the Comptroller's authority to grant compulsory licences to manufacture patented inventions. This authority is rarely invoked, although its existence may possibly have the effect of inducing patentees to grant licences voluntarily. The granting of such licences does not permit the use of established trademarks, the licence does not convey any " know how " and is valid only in the U.K. In view of these and other difficulties many manufacturers prefer to turn their resources to the development of new drugs, which can be protected and sold in both home and overseas markets.

Modifying the Duration of Drug Action

THE subject of the Conference Symposium was the modification of the duration of drug action. The pharmacological and clinical aspects were reviewed by **Dr. A. Wilson,**[2] of Liverpool University, and **R. P. Edkins,** B. PHARM, PH.D.[3] (Chief Pharmacist, Organon Laboratories Ltd.), discussed the pharmaceutical considerations governing modifications in the duration of drug activity.

Clinical aspects

Variations in drug activity may be designed to produce a more rapid effect, a more prolonged action, or a reduction in side-effects, and may be effected by chemical or physical modifications of the drug or by the addition of auxiliary substances. The use of dextran to produce an intramuscular injection of iron is an imaginative use of new substances, but so far no satisfactory solution of aminophylline has been devised.

The advantages of sublingual administration of certain drugs, such as isoprenaline and glyceryl trinitrate, are well known, but the method could be extended. The effects of potent analgesics and cough depressants when given sublingually require investigation, and the potentialities of aerosols for drug administration are largely neglected.

Pharmacological considerations

Intensity and duration of action of a drug depend on the concentration of the substance on the cells on which it acts. This in turn is determined by absorption and distribution. The most successful methods of prolonging drug action are those which reduce the rate of absorption, and injections are usually the most satisfactory preparations.

The rate of absorption of water-soluble compounds can be reduced by the use of a water-immiscible solvent. The use of oil in this way is well known, but more recently certain colloids such as gelatin and dextran have been used in a similar way. These substances have a more limited application than oil. In spite of many attempts, a satisfactory long-acting heparin injection has yet to be devised. In the case of the stable steroid hormones, the difficulties of suitable solvents have been evaded by the use of tablets that are implanted in the subcutaneous tissues.

The response to long-acting oral preparations is less satisfactory, and is due both to wide individual variations and to a lack of knowledge of the transport systems concerned in absorption. The gastric mucosa appears to act as a lipoid barrier, which permits the diffusion on non-ionised lipid soluble compounds, but selectively inhibits the absorption of an ionised form. Absorption of drugs from the intestines appears to follow a similar pattern. This theory serves to explain the differences in the absorption of acetyl salicylic acid and organic bases as quinine, but the absorption of inorganic ions, known to be essential for cell metabolism, still awaits explanation.

A newer method of extending drug action is that of inhibiting the action of the enzymes concerned with the inactivation of the compound in the body. The use of neostigmine in myasthenia gravis is based on its enzyme inhibiting power, and the extension of the principle to the prolongation of drug action has great potential value. Thus *p*-diethyl-amino-ethyl-diphenylpropyl acetate, 2 : 4-dichloro-6-phenylphenoxyethyl diethylamine, and iproniazid have been shown to influence the metabolism of many substances, including barbiturates, amphetamines and some analgesics. An investigation into these compounds may lead to new methods of extending the action of drugs.

Delayed excretion

Interference with enzyme systems has already been used to extend the action of drugs by delaying their excretion. The use of probenecid in extending the action of penicillin and sodium aminosalicylate is well known, but paradoxically the method is limited by the difficulty of obtaining an effective concentration of the interfering compound. Similar effects can be obtained by the selective storage of drugs in certain tissues, as chlorotrianisene in the body fat, and chloroquine in the liver.

Reduction of side effects

Owing to the wide variation in response to drugs, the dose must be adjusted to individual needs. The truth of this axiom is sometimes forgotten, as mixtures of drugs in one preparation are now common. In some of these the dose of each constituent is too small to have any significant action, in others the fixed proportions do not permit the individual adjustment of the dose of each ingredient.

Pharmaceutical considerations—disintegration

The effectiveness of oral preparations such as tablets is dependent upon rapid disintegration, but the standards adopted in various pharmacopœias show wide differences. With injections, a slight change in chemical structure may have a considerable effect, as in prednisolone sodium hemisuccinate.

The prolongation of the action of tablets is subject to many variables. Attempts to prolong action have been made by the use of cored tablets, with the inner core coated to delay absorption. A refinement of this method is the use of a large number of small granules for each dose. Some granules are readily soluble, others have coatings of varying thicknesses, distinguished by different colours, and a suitable mixture of granules, taken in a capsule, provides a slow and regular effect. Tablets have also been prepared from a mixed and coated granulation, but the coating may be damaged during compression.

Resin-bonding

The combination of an acidic or alkalinic drug with an ion-exchange resin is one of the most successful methods of prolonging drug action. Release of the drug from the resin complex depends only on the ion-concentration of the gastric juice. As this is fairly constant the rate of release of the drug remains steady.

Injections

Modification of the solvent affords a useful method of prolonging the effect of injections. The use of oil is familiar, and more recently certain colloids have been tried out. The mechanism of the delay action of these newer preparations is obscure. Viscosity alone is an inadequate answer, and the action may be due to a complex or a combination of factors. The prolonged action of penicillin-beeswax injections is now thought to be due to a mild inflammatory reaction of the tissues, and not to the viscosity of the injection.

Chemical modification

This method is directed to the formation of less soluble derivatives, or compounds that are metabolised more slowly. Procaine-penicillin and other insoluble salts are examples, and have several advantages. The water-insolubility confers stability, the injection of an aqueous suspension of such a compound forms a depot from which the drug is slowly released, and the action is further delayed while the compound is being metabolised to release the active moiety. The insoluble modifications of insulin are a further application of this principle.

With the steroid hormones, modification has mainly been directed towards delaying utilisation, as most of these hormones are characterised by water insolubility. Esterification with a long-chain fatty acid produces the greatest prolongation of activity, and Dr. Edkins referred to some unpublished work that indicated optimum activity is shown by pelargonates and decanoates. A uniform level of activity can be achieved by using mixed esters.

Other methods

The extension of the activity of antitoxins and toxoids by adsorption on an insoluble carrier is well known, and the method has been adapted for other substances, notably corti cotrophin. The carrier in this case is usually zinc phosphate or zinc hydroxide. Crystal suspensions of steroid hormones have a shorter action than might be expected. The duration of effect is sharply linked with crystal size, but the pain that follows the injection of larger crystals is a limiting factor. The production of suitable suspensions is further complicated by the phenomenon of crystal-growth during storage, and the difficulty of sterilising such suspensions by autoclaving if the particle size exceeds 50 μ. The use of implants of steroid hormones is now well established, and little clinical difference exists between the effects of compressed or fused implants. The absorption rate of such implants is related to the surface area, so that a higher rate is best achieved by increasing the number of implants. The implantation of a single larger product, while giving a slightly higher rate, results in a longer period of therapeutic activity.

Science Papers Cover Many Subjects

THE other papers presented at the conference ranged from new syntheses to the assay of anti-hæmophilic globulin, and reflect the ramifications of modern pharmacy. Harper *et al.*[4] investigated the stereo chemistry of some isomeric **piperidinol derivatives,** as these compounds have analgesic properties.

The work on **neuromuscular blocking agents** by Edwards *et al.*[5] was continued by an examination of N- and S-alkyl variants of dihexasulphonium and dihexazonium compounds. Some linear **N-S-bis-quaternary compounds** were shown to possess neuromuscular activity by Muir and Lewis.[6]

A number of tertiary sulphonium **quaternary ammonium salts** were examined by Brown and Turner for ganglionic-blocking activity.[7] This paper discusses the importance of the groupings on the "onium centres," and the significance of the electrolytic balance between drug and receptor site. Other pharmacological studies include a paper by Drain *et al.*[8] on some esters of **4-amino-salicyclic acid** following an attempt to eliminate some of the disadvantages of the standard drug. One compound, *p*-tolyl-4 amino-salicylic acid, was selected for further trial. The movements of potassium and calcium ions in muscles and nerves, induced by **protoveratrine A,** has been studied by Lister and Lewis.[9] The results obtained suggest that the veratrum alkaloids interfere with the normal calcium metabolism on the cell surface, and alter membrane permeability. The change in ionic balance is the factor finally responsible for the action of the drug. A further paper discusses the effects of protoveratrine on plasma potassium levels.

A comparison of the spasmolytic effects of the *iso*propyl and *cyclo*hexyl ethers of **1-(*p*-hydroxyphenyl) ethylamine** was made by McCoubrey.[11] The latter compound required an incubation period for full activity to develop, when the action was persistent. This paper has some interesting comments on the nature of morphine-like activity.

One of the side-effects of prolonged **hydrallazine** therapy is anæmia, and Kirpekav and Lewis[12] have investigated the cause. The possibility that hydrallazine might cause the anæmia by forming an iron-chelate complex was disproved by showing that such a complex had no hypotensive properties and does not antagonise the pressor response to injected adrenaline. The results of the investigation indicate that the anæmia is due to an action of the drug on the blood cells, causing hæmolysis. There was no evidence of any interference with hæmoglobin synthesis.

The physiological differences in behaviour of aspirin and **aspirin with glycine** enable many patients to receive adequate doses of the latter when aspirin alone would not be tolerated. Rapson and his colleagues[13] have attempted to explain these differences in physico-chemical terms, and have demonstrated the adsorption of glycine on aspirin particles. Marked interaction also occurs in solution, and it is suggested that such interactions may have an important influence on the transport and activity of aspirin in the body.

The preparation of a new series of phenolic ethers and their evaluation as **antifungal agents** was also described (Coates *et al.*).[14] The most promising compounds were 2-*n*-amyloxybenzamide and 2-*n*-amyloxyacetophenone.

Nitrofurantoin is now recognised as a valuable drug in urinary infections, and can be prepared by con-

densing 5-nitro-2-furaldehyde with 1-aminohydantoin. The latter has proved difficult to synthesise in good yield, but a new method was described that is both quicker and safer (Jack).[15]

The assay papers included those on the spectrophotometric determination of **alkaloids,**[16] **gas chromatography** in routine pharmaceutical analysis,[17] the particle size distribution of **phenothiazine,**[18] the application of the **flask combustion** technique to iodine containing compounds,[19] and the assay of **anti-haemophilic globulin.**[20]

Several papers had a bacteriological background and dealt with the testing of **catgut,**[21] the use of **membrane filters** in sterility testing,[22] and an indicator device for **ethylene oxide** sterilisation.[23]

The means of antagonising the anti-bacterial action of **mercury compounds** for culture work were discussed from both the qualitative and the quantitative angles,[24,25] and the mechanism of the anti-bacterial action of **oxine** was the subject of a third paper.[26]

Other shorter reports included notes on the stability of **sodium novobiocin,**[27] the absorption of **halothane,**[28] and "footprints" in **adsorbents.**[29] The object of the latter is to prepare three-dimensional patterns of molecular configurations, and to produce models of biological receptor surfaces. Such footprints may be formed in silica gel, and can distinguish stereoisomers of the same from those of a different configuration. Thus a gel with a levorphan footprint will adsorb levorphan or morphine better than the enantiomorph dextrorphan, indicating that levorphan and morphine probably have a similar steric arrangement.

Technical Press Review—October

Fibres and Plastics. — Flammability of Fabrics; Fibres and Plastics for Fire Fighting; Planned Fire Protection; The Place of Research in Textile Management.

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Pest Control Chemicals

By D. P. Hopkins, B.SC., F.R.I.C.

Insecticides in soils • Chrysanthemumic acid derivatives • Eelworm control • Selective weedkillers • Pyrethrum extracts • Fungicides for food

Soil residues and uptake

INSECTICIDES fall upon soils as well as upon crop plants and there can be a build-up of their "residues" that persists for a long time. A recent U.S. paper reports investigations on the absorption by crops of chlorinated hydrocarbon insecticides in soils.[1] The extent of uptake is variable, being influenced by such factors as the crop itself, the type of soil, and the insecticide's concentration in the soil. Lindane (gamma-BHC), DDT, and aldrin were all absorbed when present in the soils being cropped. Absorption was highest for a sandy type of soil, lowest for a "muck soil," *i.e.* one high in organic matter. The concentration of the insecticide in the soil had an effect on absorption that is the inverse of expectation—the higher the concentration, the lower is the *relative* extent of crop uptake. Of the crop plants studied, carrots showed an outstanding capacity to take up insecticide residues. With lindane the ultimate concentration in the carrot tissue was greater than the concentration of lindane in the soil. Tomatoes had one of the lowest uptake capacities. This work does not permit firm conclusions to be made about food contamination hazards. It may require years of residue accumulation in soils before uptake is quantitatively hazardous under practical conditions; against this, the accumulations tend to break down in the course of time, the rate of breakdown being highest in the types of soils that foster high uptake, and lowest in the muck soils because the organic matter in these soils binds the insecticide residues firmly. It seems a reasonable but tentative conclsuion that this problem is not likely to become a serious one.

Barthrin and isomers

A series of chrysanthemumic acid derivatives with higher toxicity to flies than allethrin has been described.[2] They are the 6-chloropiperonyl esters of d-trans-, dl-trans-, dl-cis-, and dl-cis-trans-chrysanthemumic acid, the last of which is named barthrin. At the 50% mortality level, their toxicities were 62, 38, 29 and 32% higher than that of allethrin. At the 95% mortality level, the ratios of superiority were all about a third higher. As against this, however, the knock-down values of barthrin and isomers was poorer than that if allethrin, though satisfactory at highly toxic concentrations. Another potential advantage of barthrin or its isomers is retention of toxicity during storage; year-old sprays were as efficient as freshly prepared sprays. Preliminary work has indicated that barthrin and its isomers are synergised by piperonyl butoxide to about the same extent as allethrin.

Eelworm control progress

A new chemical approach to eelworm control was first mentioned in these reports in 1958 (January, p. 33). This was the Scottish development using mercury, and a prototype machine for application was said to be in production. A new publication,[3] also from Scotland, now fully describes this machine, which is a modification of the rotary cultivator. Root eelworm and other soil diseases can be controlled by as little as 5 lb. of mercury equivalent per acre, but the field-scale development of this small-scale indication calls for very thorough mixing of the mercurial substance into the soil. Although the new report does not give full accounts of eelworm control performance (details of which are to be given in a later publication), there seems little doubt that the field-scale development work has been successful. Fully economic control over the potato root eelworm has been secured, but good control over other soil-borne diseases has also been given, *e.g.* bacterial blackleg, two kinds of root-attacking soil fungi and club root.

The best mercurial substances have been found to be mercuric chloride and yellow oxide of mercury, but the latter is much preferred for economic development. Organic compounds of mercury gave much lower levels of control. The oxide must be of very fine particle size. About 12 bushels per acre of a dust diluent are needed with the few pounds of oxide. It is said that the treatment "offers the cheapest known control of parasites which inhabit the whole soil mass, and it opens further possibilities for investigation."

The suggested mode of action of mercurial substances is unusual. All such substances are fairly quickly reduced in the soil to elemental mercury. But mercury itself has no known fungicidal or nematocidal properties. A speculative theory is that vapour from mercury upsets the relationship between host plants and soil parasites. The parasite's activity is retarded so that its main life cycle does not coincide with the main life cycle of the host plant; as it is the degree of coincidence that decides whether infection and its effects are severe, the high reduction in the degree of coincidence brought by mercury leads to much lessened outbreaks. However, an overdose will also retard the life cycle of the host plant, and when this occurs the two cycles may again coincide considerably. This theory explains why rates that much exceed 5 lb. of mercury per acre give poorer or no control. On this aspect of the work, two earlier papers may be referred to.[4, 5]

Studying virus disease of tobacco in a glasshouse at the Waite Research Institute of Australia. The Institute is concerned primarily with crop production problems.

New selective weedkillers

A larger number of triazine compounds has now been released for investigation work, following the initial products of Geigy research, Chlorazine, 1955, and Simazine, 1956. An excellent survey of these compounds has been published.[6] Some have a far greater water solubility than chlorazine and simazine. Atrazine—or 2-chloro-4-methylamino, 6-bis (isopropylamino)-*s*-triazine—may well be superior to simazine, especially for weed control with corn. Atrazine being more water soluble, the soil's moisture content is less critical. It has a post-emergent as well as a pre-emergent action, but is less persistent in soils. Of the thirteen triazine weedkillers so far tested, Atrazine could well be the best product, but it has not yet been tested widely on crops other than corn.

Another new group of weedkilling chemicals is foreshadowed in a recent paper.[7] These are chlorine substituted phenoxyalkyl alcohol esters of substituted phenoxyalkylcarboxylic acids; fourteen of these " double phenoxy " chemicals have been prepared and tested on a small scale. Some showed high activity comparable with that of 2,4,5-T. One was selected and tested by aerial spraying under field conditions; an initial and marked response was given but final evaluation will not be possible until later 1959. This compound was the 2-(2,4-dichlorophenoxy) ethanol ester of 2,4,5-trichlorophenoxyacetic acid.

New work on isopropyl carbamates has been published.[8] It has shown that a hydrogen attached to the nitrogen is not essential for this class of compounds to possess strongly phytotoxic properties. Substitution of hydrogen with other groups alters toxicity but does not remove it. Also, if the phenyl ring contains a halogen substituent in the *meta*-position, activity tends to be increased. This work may open the way for a new series of selective weedkillers.

Rothamsted research

The latest annual report from Rothamsted contains many items relevant to this subject. Crude extracts of pyrethrum may contain insecticidal substances other than those already known, and these are substances that possibly increase the knockdown effect of pyrethrin sprays.[9] Nitromethane is reported to be a solvent that can dissolve from crude extracts of pyrethrum all substances with insecticidal activity. Diphenyl methane was tried as a synergist but it actually lowered pyrethrin toxicity. A substance also tested for synergistic properties, " S. 421 " or octochlorodipropyl ether, though not very effective in this respect, was found to have its own useful insecticidal properties—about 10% as active as pyrethrum and with a definite knockdown action.

Sugar-beet research at the associated field station in the sugar-beet area has established the successful use of ethyl mercury phosphate solution (EMP) as a steeping treatment for sugar beet seeds.[10] Twenty minutes steeping in a 40 p.p.m. solution is given. This treatment led to 39% more seedlings and 7% more plants in the final stand, and compared with organo-mercury dust treatments this represented an improvement of 11 and 2½% respectively. Methoxy ethyl mercury acetate was also effective as a spray or steeping treatment but not as good as EMP.

Food fungicides

Protection of harvested and stored produce from moulds is a subject of rising importance, and two recent papers discuss the use of ammonia as a fungicide for this purpose.[11, 12] Bulk fumigation with ammonia gas seems an obvious treatment but under commercial storage conditions, which are variable, the maintenance of adequate concentration to give durable protection from mould infection is doubtful. What is called " in-package " generation of ammonia is being developed for stores of citrus fruit. Two methods are discussed. Hydrolysis of diammonium succinate, or the even simpler moisture-fostered reaction between ammonium sulphate and soda ash. The highly humid atmosphere of a store or package of respiring plant material will release ammonia steadily from these systems of generation. The second paper deals with related problems of ammonia absorption—by eggs and vegetables as well as by fruits, and by fibreboard. Developing ammonia as a generated fungicide is promising because of the low mammalian toxicity of the gas and its salts. The generation method is not only proposed for stores but also as a small-scale " tablet " system for cartons of fruit.

The use of diphenyl as an antimould substance for fruit has been discussed in a British paper.[13] Most countries seem to have been satisfied that the toxic hazard is very low but doubts about this in Switzerland are referred to. The interesting point raised in the paper is the effect of diphenyl in citrus fruit peel upon modern methods for making fruit squashes in this country. The fruit base is now made from whole imported fruit,

not as largely hitherto from imported juices. A feature of these new processes is that an extract is also made from the peel and added to the juice extracts. However, the larger risk seems to be tainting from diphenyl in peel, and the actual risk of toxicity seems exceedingly negligible. Nevertheless, these minor problems with diphenyl as a fungicide for packaged or stored fruit may help to encourage the development of "ammonia generators" as an alternative method.

The end of arsenicals

The death of a farmer's wife who drank water accidentally contaminated with arsenical haulm spray is likely to see the end of this method of killing potato haulms and killing weeds before lifting crops. Soon after the inquest Fisons announced that they were to cease the manufacture of their arsenical spray *Foliator*. Furthermore they were to withdraw hundreds of gallons already on the market.

In the October 7 issue of *The Times*, Mr. M. N. Gladstone, chairman of the British Weed Council, reported that at a meeting of the Council on October 1 it was agreed to recommend to the manufacturers of sodium and potassium arsenite that they should cease to supply these products for use as haulm destroyers and for the destruction of agricultural weeds, and to the Ministry of Agriculture that they should withdraw approval for them under the Crop Protection Products Approval Scheme.

Manufacturers would probably accept this recommendation, added Mr. Gladstone.

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COSMETICS and Toilet Preparations

By W. W. Myddleton, D.Sc.

Evolution of the indelible lipstick ● Three-phase lipstick ● Colours for cosmetics ● Suggested action on colours in Britain ● Safety of aerosol hair-sprays ● Allantoin and some new derivatives

Evolution of indelible lipstick

LIPSTICKS available before 1920 were unsatisfactory in many ways; the colouring matter was usually water-insoluble carmine which did not stain the lips and soon rubbed off with the waxy film; it gave a streaky effect deficient in intensity of colour and in opacity. An improvement was brought about by incorporating a water-soluble dye with the carmine, but, owing to the anhydrous form of the lipstick, the lips had to be wetted before application, to make the dye effective in staining the lips.

About 1920 the water-insoluble eosine dyes were introduced, but the insolubility in water, which would otherwise have left it in the same ineffective pigment form as the earlier carmine, was overcome by introducing with it a suitable organic solvent to make a true solution which could be incorporated with the wax base.

The development from this stage has been outlined.[1] Castor oil has been used very generally as a solvent for the dye and to serve as a grinding medium for the pigments, but it suffers from the defect that tetrabromofluorescein (bromo acid) has a low solubility in the oil and the stain produced is not strong. It has been found that the inclusion of propylene or butylene glycol produces more intense staining, presumably because of the water-solubility of the glycols and their greater penetrating power when applied to the skin.

A high-stain lipstick is produced by employing polyethylene glycol 400 as the chief solvent along with castor oil in which it is not by itself soluble. Miscibility of the glycol with the oil is effected by introducing propylene glycol monoricinoleate as a mutual solvent.[2]

Three-phase lipstick

The high-stain lipstick just described may be regarded as two-phase. The pigments they contain are mainly lakes of strong colour intensity.

A recent three-phase composition[3] contains a high proportion of soluble dye and none of the usual lake pigments. The amount of solvent included is insufficient to dissolve the whole of the dye and the undissolved residue takes the place of the lake pigments.

The three phases are as follows:

1. Solid wax base phase containing in the example some lanolin and lanolin absorption base as emollients and blenders and also to prevent bloom or sweating on the surface of the lipstick and at the same time to produce a sheen. The wax base is preferred to contain a little, for example 1·4% unsaturated fatty acids and esters, described as "vitamin F" to protect the lips from drying and possible irritation from the dyes. Elsewhere[4] the incorporation of allantoin in lipsticks has been recommended for similar purposes.

2. A continuous liquid phase, immiscible with the waxes and having little solvent action on the dyes. Oleyl alcohol and propylene glycol monolaurate are suitable to act as carriers to distribute the dyes throughout the wax base and to facilitate smooth application.

3. The dispersed liquid phase is formed by the glycol with its dissolved and residual undissolved dyes. It is not present in quantity sufficient to dissolve all the dye.

The limits proposed for the three phases are:

1. Wax base	14·1-26·1%
2. Carrier	47·8-70·6%
3. Dye	7·2- 9·4%
Dye solvent	8·1-16·7%

It is suggested that when the lipstick is applied to the lips the liquid phases migrate through the wax film to the skin surface so that most of the colour reaches the lips in a few minutes; there it produces a deep stain. The carrier phase and some of the solvent escapes to the film-air surface and requires to be blotted off with tissue.

While admitting that the three-phase lipstick offers some advantages over the conventional types, the paper in *Schimmel Briefs*[1] questions whether the extra time and trouble required in applying it and in blotting off the exudation of liquid phases on the surface will debar it from general acceptance. In the view of the present writer the only factor on which acceptance depends is whether the effect produced is more elegant, pleasing and permanent than could otherwise be achieved.

Colours for cosmetics

A very interesting and useful account of the organic pigments, lakes and dyestuffs suitable for use in toilet and cosmetic products has recently been presented by Anstead.[5] The paper is mainly concerned with organic materials, but inorganic pigments are mentioned here and there to illustrate special points; for example a number of electron photomicrographs are included to show, among other things, the growth in particle size of yellow iron oxide during processing by the manufacturer and correlating these changes with their efficiency as pigments.

The author has performed a useful service in drawing attention to the legal requirements laid down in the United States in the Food, Drug and Cosmetic Act of 1938 and later modifications, governing the use of colouring materials in cosmetics. The strictness of these regulations imposes serious restraints upon the cosmetic industry and particularly upon the manufacturer of lipsticks in the U.S. Colours certified for use in externally applied drugs and cosmetics cannot be used for products applied to the lips or any body surface covered by mucous membrane. The position is even more serious than is indicated by Anstead; although the present regulations apply only to coal-tar colours, it has been announced that the Secretary to the Department of Health, Education and Welfare of the United States has called for an extension of the regulations to all colours, in further amendment of the Food, Drug and Cosmetic Act.

In Canada the American pattern is followed in practice, although there is no certified list of colours for use in cosmetics. In the U.K. there is no control at present upon the use of colours in cosmetics.

Suggested action in Britain

There is an undoubted obligation upon the cosmetic industry in this country to set up some system of approval for colours used for this purpose and Anstead anticipates the setting up of specifications by the Toilet Preparations Federation. The present writer drew attention at the recent Congress of Cosmetic Science in London to the fallacy of approving or condemning any cosmetic material on the basis of its dermatological and sensitising action unless an adequate number of different samples has been examined.

It is common knowledge that impurities of many different types appear in most cosmetic materials when the conditions of preparation, storage or handling differ from the optimum conditions for the particular substance. In some cases these impurities in trace quantity can produce unfavourable dermatological action while the substance remains within the broad specification laid down by the Pharmacopœia, the schedule of the Toilet Goods Association of the United States, or the specification of the Toilet Preparations Federation. It would be quite impossible, with our present knowledge, to draw up a satisfactory specification to cover dermatological action.

This principle forms an integral part of the American legislation on the use of colours in food, drugs and cosmetics. Thus, although the colours must comply with certain stringent conditions of analysis, no clearance is allowed merely on compliance with these conditions. A large sample of every manufactured batch must be submitted to the Food and Drug Administration, and, if it is approved, a reference number is attached to it and must be quoted in any subsequent sale of any portion of the batch.

Although, in general, British manufacturers of colours and of cosmetics follow the American plan up to a point, they have no system of examination for official approval of a given colour, so that the most important safeguard is omitted. Anstead and others have recommended the drawing up of a list of permitted colours common to as many countries as possible. Even this, without the final test by an official body in each country, would be inadequate because the sources and methods of preparation would probably differ from country to country. To allow these urgent and serious matters to drift on without a serious attempt to deal with them or to take half measures will inevitably mean eventual and perhaps disastrously sudden legislative retribution.

Here is another piece of investigation which urgently requires the setting up of a research organisation by the cosmetic industry. Other examples were brought before the Congress of Cosmetic Science in April by the present writer.

Aerosol hair-sprays declared safe

Just over a year ago three St. Louis doctors reported[6] two clinical cases of pulmonary thesaurosis which they considered to have been caused by inhalation of aerosol hair-sprays. In addition the report stated that subcutaneous injection of the non-volatile residue of a hair-spray into guinea-pigs resulted in a deposit of cytoplasmic granules in the cells of the liver and spleen. The implication was that the human lesions were due to inhalation of the macromolecules used in the formulation of the hair-spray. Calandra and Kay[7] found no pulmonary thesaurosis in guinea-pigs after a 3-times daily inhalation of two hair-sprays over a period of 45-90 days.

More recently[8] four members of the Bureau of Biological and Physical Sciences, Food and Drug Administration, U.S. Department of Health, Education and Welfare of Washington, D.C., experimented with six different hair-sprays dispersed by aerosols, namely PVP; PVP-PVA; shellac; dimethyl hydantoin formaldehyde resin; modified polyacrylic acid resin; and lanolin.

The experiments were carried out on rabbits and on human subjects. The tests showed that the ingredients of the hair-sprays were essentially harmless in use.

It is reported[9] that the Food and Drug Administration, U.S.A., stated in a letter to the Chemical Specialties Manufacturers Associa-

tion of America on February 5, 1959, that after numerous tests the conclusion is reached that " there is no problem of safety for the user " of resin type hair-sprays. The problem has only recently been publicised in this country. A case of enlargement of the glands in the chest and mottling of the lungs following intensive application of a hair spray was reported in *The Lancet*, August 14 (see MANUFACTURING CHEMIST, 1959, **30**, (9), 347).

In passing, it may be mentioned that the use of PVP in sprayable water-free alcoholic hair preparations is covered by a patent.[10]

Allantoin

In an earlier report[11] the use of allantoin in cosmetics was discussed and the comment made that evidence of cell proliferant action was of a qualitative nature, based upon observations of the healing of wounds. A comment by Posner[12] was quoted, in which he arrived at the conclusion that allantoin must be more fully investigated before it can be assessed as a valuable cosmetic material.

There is no record of irritating or sensitising action after very numerous dermatological tests and it appears that this is an ideal case for its continued use in cosmetics with careful study of the results achieved, Reports continue to appear of the healing and protein dispersing action of allantoin.[13] Although, as stated by Posner[12] tissue culture has not hitherto met with significant success, it might yield quantitative results if actively pursued. A new approach to the study of human horny layers has provided a method which promises to yield quantitative results in the measurement of the dispersal of the horny layer of the skin and the investigation of the cementing matrix between the horny cells.[14]

The author points out that the term " keratolysis " is often mistakenly assumed to imply only the dissolution of keratin. In the dermatological context the term means the breaking up of the horny layer of the skin, a dispersion which does not necessarily entail an attack on the keratin molecule; it may well result from a dissolution of a cementing substance between the cornified cells. The samples used were of calloused skin areas because of the difficulty of obtaining sufficient material from non-calloused areas by scraping. Allantoin was found to be more effective than urea and next came aluminium chlorhydroxy allantoinate, one of the new derivatives of allantoin.

A microscopic examination, of which illustrations are given, confirm this order. Chemical tests involving the estimation of the amounts of extractable sulphydryl groups are also given in evidence.

Allantoin derivatives

Allantoin occurs in tautomeric forms and the enolic form can give rise to salts, as for example aluminium chlorhydroxy allantoin,[4] the stated analysis of which agrees with the molecular formula $Al_2(OH)_4ClC_4H_5N_4O_3$ with either approximately 20% moisture, or approx. $4H_2O$. This, together with aluminium dihydroxy allantoinate $Al(OH)_2C_4H_5N_4O_3$ with water content dependent upon the method of preparation, constitutes the new group of allantoinates which has recently been developed[15] and made commercially available by Schuylkill Chemical Co., Philadelphia, U.S.A., to whom the patent is assigned. They are claimed to exhibit the astringent and bacteriostatic action of aluminium compounds together with the healing, cleansing and anti-irritant properties of allantoin.

The dihydroxy compound is insoluble in water and in alcohol. The *p*H of a 4% suspension in water is approximately 7·5. Dusting powders, creams and lotions containing 0·5 to 1% have been effectively employed in diaper dermatitis and clinical observations have been made with a cream containing 0·75% of the aluminium dihydroxy allantoinate in a glyceryl monostearate base for the treatment of diaper dermatitis and eczematous eruptions due to soap, water, alkalies and synthetic detergents. It is claimed that the eruptions cleared after treatment and the formulation was effectively employed as a prophylactic to prevent a recurrence of the conditions. No evidence of local irritation or sensitisation was noted in the series of 36 patients treated.[13]

Aluminium chlorhydroxy allantoinate is reported to be an efficient deodorant[4] in the form of a 0·2% ointment. After a single application on the axillæ, inhibition was complete and lasted for 24 hr. Seventeen cases are mentioned in which the treatment was carried out daily for between 6 and 12 weeks without sign of irritation or sensitising action. Here, as in most reports of tests on human subjects in recent years, there is no mention of controls and we have no information in this case of the conditions of cleansing of the body during and before the treatment.

In vitro aluminium chlorhydroxy allantoinate was found to inhibit the development of odour and bacterial decomposition of human epidermal scales taken from patients with exfoliate dermatitis. The compound is considered to possess bacteriostatic properties.

Antiperspirant and deodorant preparations can be made either with addition of the allantoinate to the conventional aluminium chlorhydrate as in the following example[4]:

Antiperspirant-Deodorant Cream

	%
Glyceryl monostearate	16·0
Polyoxyethylene monostearate (HLB-16·9)	6·0
Spermaceti	3·0
Water	42·1
Titanium oxide	0·25
Sodium lauryl sulphate	2·0
Alumin. chlorohydroxide (50% soln.)	30·0
Alumin. chlorhydroxy allantoinate...	0·25
Perfume	0·4
	100·0

or, according to an example given in the patent[15]:

	%
Glyceryl monostearate	16·0
Spermaceti	3·0
Titanium oxide	1·0
Aluminium sulphate	15·0
Alumin. chlorhydroxy allantoinate ...	5·0
Sodium lauryl sulphate	1·5
Perfume	0·4
Water	58·1
	100·0

After-shave lotions are described containing 0·2% aluminium chlorhydroxy allantoinate in aqueous alcohol with 2% propylene glycol and 0·25% hexachlorophene.

The published account of the methods of preparation of these compounds[15] prompts the chemist to hope for more detailed descriptions which would enable him to assess the purity and identity of the products as used in the creams and lotions applied to the skin.

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(Concluded on page 416)

Lemongrass Oil from Ceylon

By M. G. De Silva*

LEMONGRASS from the *Gramineæ*, genus *Cymbopogon*, is a robust plant which grows as a tuft with numerous stiff stems at the base. There are two principal types of oil: West Indian obtained from *Cymbopogon citratus*, and East Indian obtained from *Cymbopogon flexuosus*. Oils from these two species differ considerably in physicochemical properties, especially in solubility in alcohol, West Indian lemongrass oil being less soluble in 70% alcohol.

Cymbopogon citratus is known only in cultivation, although some authorities claim that it occurs in the wild state in Java. *Cymbopogon flexuosus* is cultivated on only a small scale in Ceylon and is a native of the southern part of India. The bulk of the island's supply is from *Cymbopogon citratus* which is cultivated in the extreme south of Ceylon and also on a small scale in Peradeniya.

The grass is readily propagated by root division and cultivation is comparatively simple, the plants being spaced 3 ft. by 2 ft. apart. Regular weeding and manuring is required and the leaves are ready for harvesting after five to nine months, which is normally done three times a year. Transplanting every three to four years increases the yield. Location of the plantation, weather conditions and the age of the grass influence the yield as well as the quality of the oil.

Analysis of the citral content from the leaves of lemongrass of different ages, selected in order of formation, shows an increase in citral content from the first formed leaf up to the fifth leaf.

The citral content of oils obtained from thick tubers varies from 10 to 12%. However, fibrous roots do not contain appreciable quantities of oil. In the tubers, as in the leaves, the oil content decreases with age.

Table 1. Citral content of lemongrass leaves

Leaves in order of formation	*1st*	*2nd*	*3rd*	*4th*	*5th*
Citral content % by vol. sodium sulphite method	75·8 to 77·8	76·8 to 79·8	79·5 to 80·6	80·5 to 81·2	81·0 to 82·5

Table 2. Physicochemical properties of lemongrass oil

Source	*S.g. at 15.°C*	*Optical rotation C.*	*Refractive index at 20°C.*	*Main constituents*
Cymbopogon citratus	0·895 to 0·908	1° to 5°	1·483 to 1·489	(a) Aldehydes 1. Citral (65-85%) 2. Furfural (b) Terpenes 1. Myrcene (10-20%) 2. Dipentene (trace) (c) Alcohols (1-2%) 1. Geraniol 2. Linalol 3. Nerol 4. Methyl heptenol (d) Ketones 1. Methyl heptenone (0·2-0·3%) 2. Sesquiterpenes (1·0%)

Distillation

The leaves are cut three or four times a year; each cutting gives 5,000 to 7,000 lb. per acre. The grass is distilled while fresh to avoid the loss of oil which occurs if it is left to dry. In Ceylon the direct type of distillation is common. A copper cylinder, 5 to 7 ft. high and 3 to 4 ft. in diameter, rests on a brick fireplace about two-thirds of its height. The cylinder has an opening just large enough to introduce the grass.

The freshly cut grass is tied in small bundles and introduced into the still until it is about two-thirds full. The total charge varies from about 600 to 800 lb. The still is filled with water to about one-quarter of its capacity and distillation is started. The oil comes off in the condensed steam and is skimmed off. The yield of lemongrass oil varies from 0·3-0·4%, depending upon the season and the plant material.

The oil is bottled and kept for a few days to allow water and other deposits (usually copper salts) to separate, and it is then transferred to iron drums.

Oil formation

It is a matter of conjecture whether essential oils are formed in the epidermis of plants, as a consequence of photosynthesis, or as by-products of the metabolic activities of plants.

Microscopic examination of the leaf of lemongrass shows that the oil is enclosed in lysigenous cavities, formed by the deposition of the oil between cell walls. There are about 50 such cavities in a single transverse section of the leaf.

Physicochemical properties

Lemongrass oil has an intense lemon-like odour and taste and is reddish-yellow to reddish-brown in colour. Physicochemical properties are summarised in Table 2.

Citral is the most important constituent and is present as a mixture of at least two stereoisomers, α-citral and β-citral, varying from 70-85% in normal oil.

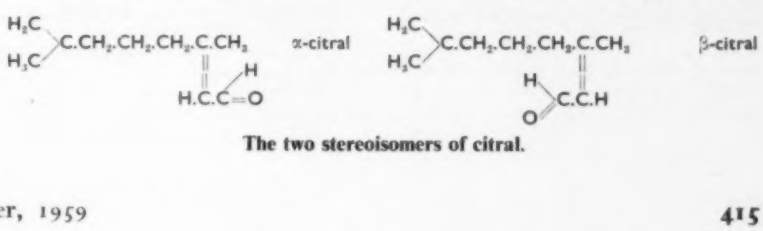
Thus, it is an aldehyde with two double bonds and can be reduced to the corresponding alcohol, geraniol. Citral also forms the characteristic odoriferous part of lemongrass oil.

According to Gildermeister and Hoffman[1] citral from lemongrass oil has the properties given in Table 3.

Table 3. Properties of citral from lemongrass oil

B.P. (at 12 mm. Hg)	*Refractive index (Na_{D17}) (at 17°C. as determined by the D-line of sodium spectrum)*	*S.g. (at 15°C.)*
110°-111°C.	1·49015	0·893

The oil has a fairly high content of terpenes together with the citral and this latter can be concentrated by distillation in vacuum.



The two stereoisomers of citral.

* Lever Bros. (Ceylon) Ltd., Colombo.

Citral, the main isolate of the oil, forms the basis of many synthetics. The most remarkable of these are the ionones, which are normally made by the condensation of citral with acetone and then heating with concentrated sulphuric acid to invert pseudoionone to ionone.

α-Ionone and β-ionone are two ketone isomers differing only in the position of a double bond. These two isomeric ionones are separated by the difference in solubility of their sodium compounds. According to a British patent,[2] the sodium bisulphite compound of α-ionone, $C_{13}H_{21}OSO_3Na{\cdot}3H_2O$, is precipitated when the solution is saturated with sodium chloride, whereas β-ionone, $C_{13}H_{21}OSO_3Na.2H_2O$, remains in solution. Properties are given in Table 4.

As lemongrass oil contains a mixture of both saturated and unsaturated compounds, the chemical nature of the oil changes on standing. This is probably due to the polymerisation of the terpenes. Citral—the major constituent—has one aldehydic and two ethylenic linkages. Hence, it is readily attacked by oxidising agents. On exposure to air citral oxidises easily, so that the reddish-brown colour changes, becoming more yellow.

Like most essential oils, lemongrass oil is adversely affected by air, heat and light and it must be stored carefully. In properly sealed containers it will keep in good condition for years. When exposed for a few weeks it changes considerably as noted in Table 5.

Table 4. Properties of α- and β-ionone

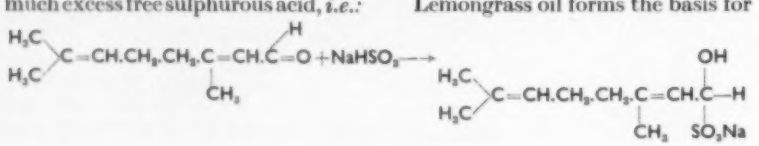
	B.p. at 11 mm. Hg	S.g. at 20°C.	Refractive index (at 20°C., D-line sodium spectrum)
α-Ionone	123-124·5	0·932-0·933	1·4980-1·500
β-Ionone	134-139	0·946-0·949	1·5200-1·5212

Table 5.

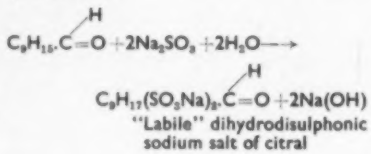
Lemongrass oil	S.g. at 30°C.	Citral content by volume. Sodium sulphite method %
Fresh	0·8965	76·5
Exposed to air for 2 weeks at room temp. ...	0·8986	75·1
Exposed to air for 4 weeks at room temp. ...	0·9018	74·4

Analysis

The quality of lemongrass oil is best determined by its citral content. In normal oil this varies from 65 to 68%. Two methods—sodium bisulphite and sodium sulphite—are used to determine citral content. The former method gives higher values (2-5%), as it determines a part of methyl heptenone with citral (see Table 2). The principle of the method is that the normal bisulphite compound is formed quantitatively, when an oil containing citral is shaken with a sodium bisulphite solution containing a fair amount of free acetic acid and not much excess free sulphurous acid, *i.e.*:



A neutral sodium sulphite method is widely applicable and gives good results with lemongrass oil. Its principle is that most aldehydes and ketones combine with neutral sodium sulphite to form water-soluble compounds. In the case of citral the following reaction takes place:



"Labile" dihydrodisulphonic sodium salt of citral

The alkali hydroxide liberated in the reaction would decompose the dihydrodisulphonic compound as it was formed, and for this reason the solution should be kept only slightly alkaline (pH about 8). If the solution is acidic, a very stable dihydrodisulphonic compound is formed from which citral cannot be obtained.

Perfumery and other applications

With its intensive, fresh and persistent lemon-like odour lemongrass oil finds its main applications in perfumery. Lemongrass oil also contains 10-20% of myrcene, which itself has wide perfumery applications. According to Pickthall,[3] myrcene performs well in milled toilet soaps.

By distilling lemongrass with sodium bisulphite 100% citral can be obtained. Wells[4] shows the effect of citral in its odour performance in soap. When used in soap 98-100% citral gives a good lemony odour after one month, but after six months this fades. The soap is also liable to yellow slightly, although wrapped samples fade less.

Lemongrass oil forms the basis for many synthetics, the most remarkable being the ionones, one of the most important groups of synthetic aromatics. They are indispensable in floral odours and in many fancy compositions. α-Ionone is fresher and more fragrant than β-ionone. Freshly distilled ionone has a decided odour of cedarwood and is practically colourless. It is only in dilute solution that it has an odour of violets which is most valuable in perfumery.

Lemongrass oil has now attracted the attention of pharmaceutical chemists as a raw material in the synthesis of vitamin A.

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PLANT AND EQUIPMENT

▶CARTRIDGE CONDENSER

A new condensing unit for handling corrosive vapours consists of a graphite element or cartridge enclosed in a cylindrical steel jacket with carbon inlet and outlet heads. The unit, known as the *Cartridge Condenser*, is available in eight sizes ranging from 4 ft.² to 200 ft.² H.T.A.

The cartridge condenser is said to offer advantages of resistance to acids, alkalies and solvents, high thermal conductivity and low pressure drop. The units are of simple construction, light in weight, and are stated to occupy less space than is normal for equipment of equivalent performance. Each unit carries a 12 months guarantee.

▶CHROMATOGRAPHIC OVEN

A chromatographic drying oven from Baird and Tatlock (London) Ltd. comprises a stove-enamelled sheet-steel carcase with a stainless steel interior, round which thermal insulation is provided to a depth of 2 in. Heating is by electric metal-clad lattice heaters housed in the side-walls of the interior oven space, operating at black heat and controlled by a contact thermometer operating through a heavy-duty mercury relay. A thermometer is fitted and temperature can be varied from ambient to 220°C. In addition to the contact thermometer control, an overriding safety thermostat is fitted which automatically disconnects the heaters if the oven temperature rises above 220°C.

The oven can be run as a closed air circuit system or can be vented to atmosphere or fume trunking. Forced draught circulation is by an electrically driven centrifugal fan. Air is circulated across the oven through vents pierced in the side-walls. An internal flow-rate control is fitted to enable the transfer rate of air across the oven to be regulated. An air inlet control is fitted to regulate the volume of air admitted at the base of the oven and a similar control is fitted to the air outlet vent at the top of the oven. Each of these controls is operated by a calibrated knob which permits reproducible conditions to be obtained. Facilities are provided for running the oven under forced draught at ambient temperature with the heaters switched off.

The effective working space is 25 in. ×25 in. ×18 in. deep, giving a capacity of about 6 cu. ft. A telescopic stainless steel pull-out rack, fitted with a heat resistant handle, carries fifteen glass rods which will accommodate sheets of chromatographic paper up to 22½ in. square; the oven will therefore take over 50 sq. ft. of paper. When the oven is used for general laboratory work three wire mesh shelves can be fitted to internal runners. The oven has an interior door of *Armourlight* glass which seals against a silicone rubber gasket and permits inspection of the oven contents without undue loss of heat.

The oven has an overall size of approximately 36 in. wide by 45 in. high by 26½ in. deep, and is suitable for bench mounting. It is finished in grey stove enamel with a black plinth, trimmed in black rubber extrusion.

Smokeless operation is claimed for this Riley-Pillatt incinerator.

▶CONTINUOUS MONITORING

A continuous-flow refractometer, made by Hilger and Watts Ltd., makes a continuous comparison between a reference liquid and a flowing sample. Any change in the concentration of the sample is shown on a meter or recorded. If desired, the instrument can be incorporated in an automatic control system to restore the concentration of the sample to the correct level.

The instrument uses a null-balance system of measurement; and any change in the refractive index of the sample unbalances the system. A servo mechanism restores the balance and indicates the difference between the indices of the sample and reference liquids. The cell containing the two liquids is made from a stainless steel that is approved for use in the food industries. The cell is surrounded by a bath of water, which helps to maintain the cell at a constant temperature. When very high accuracy is required the reference liquid and the water in the bath may both be circulated through an external heat exchanger.

The instrument is said to be particularly suitable for continuous monitoring in process-control systems and is claimed to have many advantages over manual methods of sampling and measuring.

▶SMOKELESS INCINERATOR

Riley (IC) Products Ltd. have acquired the manufacturing rights for the Pillatt incinerator which they now market as the *Riley-Pillatt* incinerator. Combustion is said to be virtually smokeless when the usual forms of general refuse are being burnt and the incinerator thus fulfils the demands of the Clean Air Act.

The incinerators are encased in cast iron and can be positioned in the open or under cover. Two features are the controlled openings for the admission of secondary air and a baffle chamber designed to direct the waste gases downwards over a water seal before entering the flue. A mild steel chimney is generally supplied with each unit, but it can be connected by smoke piping to an existing flue or chimney.

▶BALL-CONVEYOR

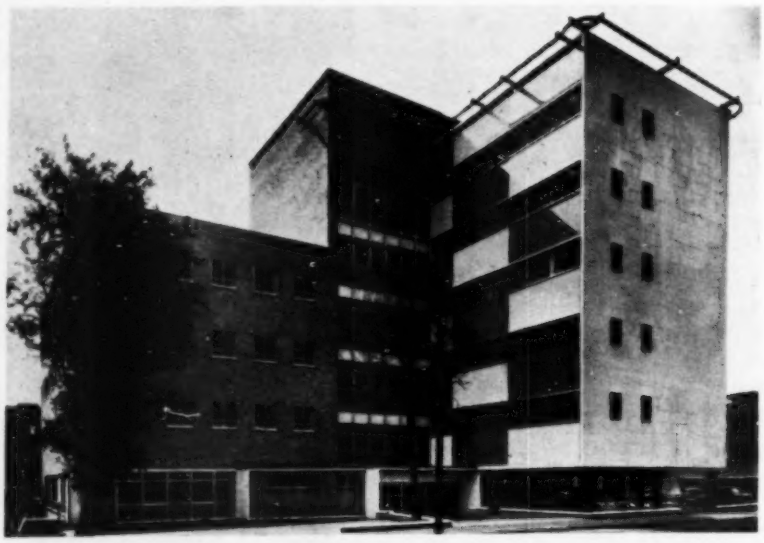
The *Transveyor* ball assembly, made by J. Collis and Sons Ltd., allows movement in all directions. It consists of a 1 in. dia. hardened steel ball surrounded by 100 smaller balls in a hardened hemispherical housing. Dust and dirt are excluded by a felt washer and the assembly is secured by a steel cap. Either a rigid flush fitting or a flexibly cushioned adjustable model is available. Capacity per ball assembly is 60 lb. and a 300 lb. model with a 1½ in. dia. ball is also made.

A heavy duty model of the conveyor is also produced. This has a 2 in. dia. ball, and features include an oil-seal and a forged steel housing. Capacity is 750 lb. per assembly. A 2,240 lb. model with a 3 in. dia. ball is available to meet special requirements. According to the manufacturers maximum unit load can be as high as the capacity of the ball assembly multiplied by the number of balls in contact with the load.

BOOTS' NEW £750,000 RESEARCH CENTRE

Increased emphasis on medical research

A new biological research centre which cost £750,000 to build and equip was opened in Nottingham by Boots Pure Drug Co. Ltd. last month. The seven-storey building with its 24 laboratories will provide the most up-to-date facilities for research in pharmacology and chemotherapy and for analytical and control work in the bio-assay and microbiology divisions of the company's standards department. With a total of 88,000 sq. ft. of floor space, the new building is situated in Pennyfoot Street, close to the centre of Nottingham and not far from Boots' headquarters in Station Street.



Boots' new biological research centre. It has 24 laboratories and cost £750,000 to build and equip.

Modernisation programme

The erection of this new biological centre is part of a general programme of modernisation and expansion of the company's research facilities. Medical research at Boots has been expanding rapidly in the years since the war, and within the last three years alone there has been an increase of 25% in graduate staff engaged in this work. Space has been allowed in the new building for a further increase of 50%.

The building also houses the company's scientific library of 25,000 volumes, believed to be the largest owned by any pharmaceutical company in Great Britain, and includes a new lecture theatre to seat 200. An up-to-date feature in the laboratories is a radioactive isotope unit which will give Boots' scientists greatly improved scope for the study of the movement of drugs in the body.

In addition to increased space and new equipment, advantages will be gained from housing under one roof related work that has previously been scattered. Administrative offices of Dr. G. I. Hobday, Boots' director of research, are also to be found within the building, as is the medical department which is responsible for the clinical evaluation of new drugs and products and for liaison between research scientists in the laboratory and clinicians at home and abroad.

Research aims

"This new research centre," said Dr. Hobday in a statement upon the occasion of the opening, "places Boots amongst the leading British companies carrying out medical research on a large scale and proportionately strengthens this country's position in the face of overseas competition. In the medical field research is very expensive and success depends on the possession of adequate facilities and the determination to spend a substantial proportion of profits on the use of them."

It is hoped that the facilities now available will give new impetus to the company's research into certain specific infectious diseases, including tuberculosis, influenza and the common cold, and to their long-term investigations into rheumatism, diabetes and coronary heart disease.

In the new building investigations will also be carried out into possible new treatments for tropical diseases, a field in which the company has specialised. Research on antibiotics will be linked with the work of the specialist laboratory opened in 1956 on the site of the antibiotics factory on the outskirts of Nottingham.

Industry's Publications

French Canadian catalogue. Negretti and Zambra Ltd. have produced a French Canadian edition of their general catalogue. Published in French, it is the fourteenth edition of the publication.

Heating tapes. Flexible heating tapes for laboratory and industrial use manufactured by the Stabilag Co. Ltd. are said to provide a simple and compact method of pipe-tracing and to have a high efficiency. Revised literature dealing with their applications is now available from the company on request.

Xylocaine. A booklet from Duncan, Flockhart and Co. Ltd. gives information on applications of *Xylocaine* local anæsthetic in general practice. Techniques, dosage and properties of *Xylocaine* are described. The company has also published a descriptive price list which includes details of three recent additions: *Trophenium* for the production of controlled hypotension in surgery; an analgesic, *DF*118 dihydrocodeine bitartrate; and *Atrol*, a mild cerebral stimulant.

Essential oils. The current issue of the House of Magnus, published by Magnus, Mabee and Reynard Inc., describes essential oils and imitation flavours for pharmaceuticals.

Alcohols and detergents. Two leaflets from Marchon Products Ltd. give composition, characteristics and uses of the company's *Laurex* range of primary fatty alcohols and *Nansa* powders. The latter are free flowing alkyl aryl based powders with a number of applications in the detergent field.

Nitrogen generator. A catalogue published by the dryer and gas plant division of Birlec Ltd., gives details of the new range of Birlec nitrogen generators. Birlec nitrogen generators, which are designed to provide the right grade to suit a wide variety of applications, separate nitrogen from air by the combustion of fuel, thus converting its oxygen content into carbon dioxide and water. These two waste constituents are then removed by absorption and condensation respectively.

BOOK REVIEWS

Perfumes, cosmetics and soaps

By W. A. Poucher. Vol. I. Being a Dictionary of Raw Materials, together with an Account of the Nomenclature of Synthetics. Chapman and Hall, London, 1959. 6th Edn. revised. Pp. 463. 75s. net.

THE fifth edition of this volume was published 18 years ago, and in spite of the author's statement in the preface that the intervening period has revealed a striking paucity in the discovery and production of new aromatic raw materials, the reader could expect to find in a work of the declared scope of this volume references to more than a single item in the literature as recent as 1940. The one item in question is referred to in the text as a " recent study."

Another example of this occurs in the acount of the esters of *p*-hydroxy benzoic acid which are described in the fourth edition (1936) and in the sixth (1959) as " these new substances." The bacteriostatic action of the esters is quoted from a paper published in 1931. No mention is made of the inhibiting action of the non-ionic emulsifiers on these preservatives, a subject which has been a matter of considerable concern to the cosmetic industry for several years and has been discussed at great length in the literature.

There are positive errors in subject matter here and there and some have gone uncorrected since the fourth edition. As an example musk ambrette is described as trinitrobutyl - meta - cresol - methyl ether with a formula to illustrate. The Essential Oil Association of U.S.A. in Standard No. 25 describes musk ambrette as a di-nitro compound.

By " amyl undecylenate " on p. 41 " amyl undecylate " is intended. Oleyl alcohol (p. 310) is not $C_{17}H_{33}OH$ and ammonium thioglycolate (p. 399) is not $HS.CH_2.COONH$.

On p. 196 the glyceryl monostearate described is presumably the self-emulsifying variety which is a mixture containing an emulsifying agent which may be a soap, a salt of a sulphated higher alcohol, or a non-ionic.

Although oleyl alcohol is given a place in this edition, oleic acid and other unsaturated fatty acids are not, and they are not included in the table of fatty acids at the end of the volume.

In the category of animal and vegetable oils turtle oil occupies more than a full page, sweet almond oil 5 lines, arachis oil 10 lines, castor oil 12 lines, sesame oil 8 lines and olive oil finds no place at all.

This reviewer has little pleasure in concluding that this edition does not measure up to expectations which are natural in view of the eminence of the author.

WM. W. MYDDLETON.

Handbook of Toxicology

Vol. IV—Tranquillisers. By M. Gordon and R. F. J. McCandless. Saunders, Philadelphia and London. Pp. 120. 28s. net.

IT is a reflection on the widespread use of tranquillisers, since their introduction six years ago, that Volume IV in the series of " Handbook of Toxicology " should be devoted to these drugs. Certain instances of abuse of therapy are bound to result from their extensive use in clinical practice, and those who work closely with tranquillisers will welcome for reference an up-to-date tabulated record of their toxic reactions.

This useful monograph of little over a hundred pages gives short precise details of the structure and animal and human pharmacology, in addition to the toxicology, of 26 of the better-known psychopharmacologically active compounds. In addition to chlorpromazine, reserpine and meprobamate, this handbook gives details about the newer and more potent phenothiazines such as trifluoperazine and triflupromazine.

Much has been done in the last few years to improve the treatment of the manic and agitated patient, and it is likely that the next big advance in the treatment of mental ill-health will be towards helping the large number of patients who are depressed. It is therefore good to see that the authors have included information about drugs such as dextro-amphetamine and iproniazid which have been shown to have anti-depressant activity.

GORDON HARGREAVES.

Bookshop Service

All books reviewed in MANUFACTURING CHEMIST and all other scientific or technical books may be obtained from: Technical Books, 308 Euston Road, London, N.W.1. Telephone: Euston 5911.

Organic reagents. Monograph No. 37 (1959) issued by Hopkins and Williams Ltd. describes physical and chemical properties and method of use of their *Zincon* reagent for zinc and mercury. Information is given on the detection and absorptiometric determination of zinc and mercury, and on the volumetric determination of zinc using *Zincon* as indicator.

Recording spectrophotometer. An illustrated 26 pp. booklet published by Hilger and Watts Ltd. describes the Hilger *H*800 recording infra-red spectrophotometer and its applications. The instrument operates on a double-beam principle and among advantages claimed for it are versatility, simple operation and large area for cells and samples.

Petrochemicals. An eight-page, two-colour corporate brochure from Houdry Process Corp. depicts the company's contributions to petroleum, petro-chemical and chemicals, and details the firm's processes, products and services. In addition, Houdry's engineering, research and development, and manufacturing capabilities are discussed on separate pages.

Automatic analysis. A new application data sheet describing the use of their *AutoAnalyzer* for continuous automatic chemical analysis of antibiotic broths is available from Technicon Instruments Co. Ltd. Contents of fermentation vats are constantly analysed at the rate of 20, 40 or 60 samples per hr.; growth progress is continuously reported; the exact moment when harvesting should begin is indicated. This ensures maximum broth yield, integrity of production scheduling, and end of product loss in production. Types of antibiotics autoanalysed and a list of users are included in the data sheet, which also describes the laboratory and on-stream plant models.

NEWS . . .

A.B.C.M. annual dinner

British Chemical Industry's Ambitions in European Common Market

EXPORTS was the theme of the two speeches at the annual dinner of the Association of British Chemical Manufacturers held in London on October 7. The chairman of the association, Mr. B. Hickson, left no doubt that the chemical industry in general is very disappointed at Britain's failure to participate in the European Common Market. "We are vitally interested in the European trade negotiations being conducted in Stockholm.

In the hope that a bridge can be rebuilt between the Common Market and the Outer Seven, our association had given H.M. Government our approval to the suggestions for such a Stockholm Treaty which might mitigate the disastrous failure which occurred last December. We cannot afford to allow the trading community of Western Europe to be split into two contentious and restrictive blocs."

Collaboration with European chemical industries is being maintained and increased. An information exchange centre for the chemical industry has been set up in Zurich which arranges regular meetings of the directors of European chemical manufacturers' associations. Customs valuations, foreign investments in Europe, dumping and tariffs are among the subjects discussed. Professional training is also under discussion and it is hoped to get a European international standard of measurement of qualifications.

The theme of international trading was taken up by the chief guest at the dinner, Sir Cecil Weir, who is chairman of the F.B.I. Working Party on export trade facilities. He congratulated the industry on being the third largest British exporting industry and emphasised the importance of its maintaining and increasing its trade in Europe. If there were tariffs to surmount then the industry must establish branches and joint manufacturing and marketing enterprises inside the Common Market.

Sir William Garrett

Turning to industrialisation abroad, Sir Cecil Weir said that this was to be welcomed because our best customers are those which have developed secondary as well as primary industries.

Because of the General Election on October 8, the association's annual meeting was held on October 7, the same day as the dinner and not the day after, as is customary. At the meeting the new chairman was elected. He is Sir William Garrett, personnel director of Monsanto Chemicals Ltd.

Symposium on powders

The Surface Activity Group of the Society of Chemical Industry is holding an International Symposium on Powders in Industry on September 29 and 30, 1960, at the Royal Institution, London. The chairman of the Group is Sir Eric Rideal, F.R.S., and the chairman of the Organising Committee is Dr. M. G. Fleming, of the Bessemer Laboratory, Imperial College of Science and Technology.

The purpose of this meeting is to bring together scientific and technological representatives of some of the many industries in which fine powders are of importance, whether as raw material, an intermediate processing stage, or final product, and provide opportunity for discussing mutual problems in widely diverse industrial fields. The application of powders is so varied that many of the users may be unaware of developments in otherwise unrelated industries which could assist them.

A preliminary programme and further information may be obtained from the Hon. Secretary of the Surface Activity Group, The Society of Chemical Industry, 14 Belgrave Square, London, S.W.1.

International Cosmetic Federation inaugurated

The International Federation of Societies of Cosmetic Chemists was formally constituted at meetings held in Brussels recently.

The first President of the Federation elected by the Council is M. G. de Navarre, PH.C., B.S., M.S., a founder member and first President of the Society of Cosmetic Chemists (U.S.A.).

An interim management committee was set up to initiate the work of the federation; members are: R. H. Marriott, D.SC., F.R.I.C. (U.K.), L. W. Masch, DR.ING. (Germany), and K. Pfeiffer, DIPL.ING. (Switzerland). The Secretariat of the Federation is at present in London. Enquiries should be directed to: Mrs. E. Millman, B.A., B.SC., 2 Lovers Walk, London, N.3. Tel. FINchley 4302.

Drug firms help College of Surgeons

Gifts to the Royal College of Surgeons appeal fund, totalling £10,516, have been received from the following pharmaceutical companies: The Beecham Group Ltd.; Chesebrough-Ponds Ltd.; A. Wander Ltd.; Coty (England) Ltd.; Timothy Whites and Taylors Ltd., and Colgate-Palmolive Ltd.

Last March it was announced that the Royal College of Surgeons urgently needed £3m. to spend on vital medical research, teaching graduates from Britain and the Commonwealth surgery, and the rebuilding of their premises, which were severely damaged during the war. To date they now have £1,786,655 1s. 9d.

The Royal College of Surgeons receives no research grant from the Government, nor is it part of the National Health Service. It is entirely dependent on voluntary support.

Arenco-Alite merger

Arenco AB of Sweden and Alite Machines Ltd. of Great Britain have formed a company under the title of Arenco-Alite Ltd., Pixmore Avenue, Letchworth, Herts. (Letchworth 965), where new showrooms will be backed up by modern testing and experimental laboratories. At the same time an arrangement has been entered into for the selling and servicing of the *Kisab* range of strip wrapping machines in this country.

The range covers the handling of powders, granulated materials and pastes, from mixing, sifting, compressing, filling and continuous metering and mixing machines to semi and fully automatic machines for bag opening, filling and closing, incorporating heat-sealing arrangements for the handling of film, aluminium foil and other laminate materials, the packaging of liquids, granular materials and tablets. This is backed by the full range of Arenco tube filling and heat sealing machines.

Offices bought

The Distillers Co. Ltd. has bought from I.C.I. an office block known as Bolton House which stands at the corner of Curzon Street and Bolton Street, London, W.1.

New C.W.S. laboratory

A new laboratory for testing soaps and detergents, with a staff of 20 scientists and assistants, has been built at the Co-operative Wholesale Society's soap works at Irlam, near Manchester.

Well equipped and designed in a contemporary style, it replaces an old laboratory in which accommodation, both for staff and instrumentation, was inadequate for the growing volume of testing and research work.

The planning of the laboratory was carried out jointly by the C.W.S. Architects Department, the manager of the works, Mr. J. G. McGurk, and the chief chemist, Mr. H. T. Sutcliffe. It was built by the Society's building department and electrical, water and gas installations were carried out by the engineers' department.

Three-company merger

The companies of Bush Beach and Gent Ltd., Frank Segner and Co. Ltd., and F. S. Bayley, Clanaham and Co. Ltd., have merged to form one company under the title of Bush Beach and Segner Bayley Ltd. The new company will operate as a supplier of heavy, fine and pharmaceutical chemicals and as a technical advisory organisation affording assistance on their uses and applications.

The directors of Bush Beach and Segner Bayley Ltd., are: D. A. Gates, chairman and managing director; W. E. Powell, executive director; W. C. Wiggins, executive director; J. F. A. Segner, executive director; and Miss E. M. Mason, non-executive director. L. B. Sandeman has been appointed as secretary. The new board has been formed from existing directors of the three companies, Mr. Gates being the former chairman and managing director of Bush Beach and Gent Ltd. and associated companies.

A. G. Spicer and W. E. Glasspool have been appointed as divisional managers for the new company, with D. Kellett as technical manager (leather chemicals) and H. C. Rosen as technical manager (machinery).

The merger, made desirable by the expanding activities of the three companies, has been effected to simplify administration and to establish an improved integrated sales service. The head office is at Marlow House, Lloyd's Avenue, London, E.C.3, with a Northern sales office at St. James' House, Brazennose Street, Manchester 2.

In addition, a new branch sales office has been opened at 61 King Street, Leicester.

This new C.W.S. laboratory will be used for testing and quality control of soaps and detergents.

ISIS Appointments Register—New Service for Industry

Competition among employers for science graduates is as strong as ever, as is proved by the large sums now being spent on advertisements in newspapers and technical journals. To the cost of advertising must be added the expense of management consultants and others whose services are being used to help satisfy the often desperate need for scientific and technological recruits of graduate status. A far less expensive way of solving this problem has been put forward by Mr. Leonard Hill, Chairman of The Leonard Hill Technical Group of periodicals, reference books and textbooks. His long experience as a technical and industrial publisher has given Mr. Hill a deep insight into the problem of staff recruitment, and the new system he proposes is the fruit of a long study of the situation. The idea—like most good ideas—is simple.

Most students seek temporary employment during the university vacations. Mr. Hill proposes that science students should work temporarily for firms of the type which would offer them jobs after they have graduated. This would enable students to become acquainted with industries in which they propose to make careers and, conversely, would enable firms to assess the potentialities of young men and women whom they may wish to employ after they have obtained their degrees. Both sides stand to benefit enormously from this scheme of selective vacation employment, and because there are such strong mutual advantages it should work well.

How will it work? Mr. Hill has established the ISIS Appointments Register at the headquarters of The Leonard Hill Group, 7-9 Eden Street, London, N.W.1. Science students will be invited to apply for registration and firms requiring temporary staff will be invited to submit details of the jobs they can offer. In this way ISIS will bring together employers and employees in an economical and efficient manner. A further saving to employers will be the elimination of extra work caused by the employment of temporary workers. This will be done by employers paying ISIS, who will in turn pay the students and deal with all income tax and insurance details. In effect, the students will be employed by ISIS.

Training

During the period of temporary employment firms will be expected to give students work commensurate with their abilities, with the knowledge that the way in which the students are treated will naturally influence their choice of future career and employer. Most students will cheerfully undertake most jobs, provided they are intelligently and sympathetically handled and are given proper opportunities to assess the career possibilities offered.

ISIS Appointments Register will being together employers and future employees for a valuable preliminary period. The use that is made of this period depends upon the good sense of each side.

Employers who require further details of this service to industry should communicate immediately with ISIS Appointments Register, 7-9 Eden Street, London, N.W.1 (Telephone Euston 5911). Registration of employers' requirements for the Christmas vacation will begin on October 30.

Pharmaceutical Conference 1960

Next year the British Pharmaceutical Conference goes to Newcastle-on-Tyne, where it held its first meeting in 1863. The chairman will be Prof. W. H. Linnell, Dean of the School of Pharmacy in the University of London.

Albright and Wilson's new agents for Sweden

Albright and Wilson (Mfg.), the largest producers of phosphorus in Europe, have appointed Axel H. Ågren A/B of Gothenburg their sole agents for Sweden.

Albright and Wilson has a long-established export business to Sweden for a wide range of phosphorus compounds and phosphates, and some fine chemicals and organic products.

Axel H. Ågren A/B also represent throughout Sweden Marchon Products Ltd., another company in the Albright and Wilson group and a leading producer of detergents.

Changes of address

Johnsen and Jorgensen Ltd., have moved to new offices on the third floor of 30 St. Bride Street, London, E.C.4 (Ludgate Circus 0701). The company was formerly called Johnsen and Jorgensen Flint Glass Co. Ltd.

Acme Conveyors Ltd. have completed the transfer of their detail design buying and accounts departments, to their office extension situated at 58/62 Seaward St., Glasgow, S.1. This will result in better and more centralised co-ordination with the works at Hillington Industrial Estate, Glasgow S.2.

The technical sales and project departments of the company, and Acme Ventilating Ltd., continue to be administered from Acme Chambers, 1 Bradford Street, Walsall.

New warehouse for sanitary products

Jeyes Sanitary Compounds Co. Ltd., have opened a new warehouse at River Road, Barking, Essex. The building, which was originally an aircraft hangar, is 26 ft. high and 150 ft. long. The floor area is 15,000 sq. ft.

The warehouse provides urgently needed storage and dispatch facilities and relieves congestion at the Barking factory. The company has specialised in domestic disinfectants, liquid soaps, bath soap, insecticides, deodorants, etc., for many years. It was founded in Plaistow, London, in 1877. Four years ago Jeyes acquired the Ibbetson group of companies, manufacturers of *Ibcol*, *Sanilav*, *Miraglo* and other products.

The official opening of the warehouse was performed by the Mayor of Barking, who was introduced by the managing director, Mr. R. G. Berchem, M.SC.

Paper rubbish sacks

The use of multi-wall paper sacks as containers for refuse, which has been adopted in Sweden, Denmark, Holland, West Germany and Norway, has been introduced in England by William Palfrey Ltd., manufacturers of *Palfsack* multi-wall paper sacks. When the sacks are full, the user seals them with a simple closure and they are removed by the dustman.

The company produce suitable sacks and stands for use in homes, hospitals, schools, hotels, factories, office blocks, etc., where, it is claimed, considerable savings in rubbish handling costs can be immediately achieved. Stands are freely available and can be used either for outside or in the home or institutions referred to, or can be used in conjunction with rubbish chutes.

More approved names

The British Pharmacopœia Commission has issued the following supplementary list of approved names.

Approved names are adopted on the advice that they are free from conflict with trade marks registered in Great Britain and Northern Ireland. In some instances the names, other than the chemical names, appearing in the second column, are applied to preparations of the substance; they also include some registered trade marks.

Approved name	Other names
AMBUTONIUM BROMIDE	
(3 - Carbamoyl - 3: 3 - diphenylpropyl) ethyldimethyl - ammonium bromide	
CHLORTHENOXAZIN	
2 - 2′ - Chloroethyl - 2: 3 - dihydro - 4 - oxobenz - 1: 3 - oxazine	
DIAMTHAZOLE	
6 - 2′ - Diethylaminoethoxy - 2 - dimethylaminobenzothiazole	
Asterol is the dihydrochloride	
DIETHYLTOLUAMIDE	
N.N-Diethyl-*m*-toluamide	
DODICIN	
2 : 5 : 8 - Triazaeicosane - 1 - carboxylic acid	Dodecyl-di (aminoethyl) glycine
ETHIONAMIDE	
2-Ethyl*iso*nicotinthioamide	
FLUMETHIAZIDE	
7 - Sulphamoyl - 6 - trifluoromethylbenzo - 1: 2 : 4-thiadiazine 1 : 1-dioxide	
GUAIPHENESIN	
3 - *o* - Methoxyphenoxypropane - 1 : 2 - diol	Guaiacol glycerol ether
	Respenyl
HALOPERIDOL	
4 - *p* - Chlorophenyl - 1 - (3 - *p* - fluorobenzoylpropyl)-piperidin-4-ol	
KANAMYCIN	
An antibiotic produced by *Streptomyces kanamyceticus*	
	Kantrex
METAHEXAMIDE	
1 - (3 - Amino - 4 - methylbenzenesulphonyl) - 3-*cyclo*hexylurea	
	Euglycin; Melanex
METFORMIN	
N′N′-Dimethyldiguanide	
METHAQUALONE	
2 - Methyl - 3 - *o* - tolyl - 4 - quinazolone	
Melsedin is the hydrochloride	
METHAZOLAMIDE	
5 - Acetylimino - 4 - methyl - 2 - sulphamoyl-1 : 3 : 4-thiadiazoline	
	Neptazane
PHENFORMIN	
N′-Phenethyldiguanide	
	D.B.I.
PROPYL DOCETRIZOATE	
Propyl 3-diacetylamino-2 : 4 : 6-tri-iodobenzoate	
PROXYPHYLLINE	
7-2′-Hydroxypropyltheophylline	
	Brontyl
SULPHASOMIZOLE	
5 - *p* - Aminobenzenesulphonamido - 3 - methyl-*iso*thiazole	
THIORIDAZINE	
10 - [2 - (1 - Methyl - 2 - piperidyl) ethyl] - 2 - methylthio-phenothiazine	
Melleril is the hydrochloride	

Index to the supplementary list

(See the list for the full Approved name and the chemical name)

Proprietary name	*Approved name reference*
Asterol	Diamthazole
Brontyl	Proxyphylline
D.B.I.	Phenformin
Euglycin	Metahexamide
Kantrex	Kanamycin
Melanex	Metahexamide
Melleril	Thioridazine
Melsedin	Methaqualone
Neptazane	Methazolamide
Respenyl	Guaiphenesin

Change of address

The Chemicals Trading Co. Ltd. have moved to Cree House, 18-20 Creechurch Lane, London, E.C.3. Telephone Avenue 5488.

Perkin centenary trust

The Perkin Centenary Fellowship has been awarded to Mr. B. Whitear, A.R.I.C., of Plaistow, and will be tenable from October 1 next in the Department of Chemistry at the University of Southampton.

Perkin Centenary Scholarships have been awarded to Mr. R. R. Cox of Birmingham, tenable at the University of Birmingham; to Mr. B. T. Lawton of Walkden, near Manchester, tenable at the Royal Technical College, Salford; and to Mr. D. J. Pearson of Horsforth, near Leeds, tenable at the Bradford Institute of Technology.

The Perkin Centenary Trust was established as a lasting memorial to the discovery in 1856 of the first important synthetic dyestuff, Mauveine, by William Henry Perkin. The secretary to the trustees is Mr. J. R. Ruck Keene, c/o The Chemical Society, Burlington House, London, W.1.

Surface activity group

At the first A.G.M. of the Surface Activity Group of the Society of Chemical Industry, Sir Eric Rideal, F.R.S., was appointed chairman. The Hon. Treasurer is R. C. Tarring, Hon. Recorder F. Riley and Hon. Secretary M. K. Schwitzer, (Armour Hess Chemicals Ltd., 4 Chiswell Street, London, E.C.4. Telephone Metropolitan 0031).

The object of the Group is to advance science and technology in the field of surface chemistry, colloid science and allied scientific disciplines and to consider all scientific aspects concerned with the production, research and use of surface-active substances.

Its next meeting will be held on Friday, December 4, at 6.30 p.m. in the Main Chemistry Lecture Theatre, Manchester University. Dr. P. A. Winsor will talk about solubilisation with amphiphilic compounds.

Company finance

I.C.I. Group sales in the first half of 1959 were £250 million against £232 million in the first half and £463 million in the whole of 1958. The increase in sales has stemmed from a reduction in the prices of many I.C.I. products. The directors have declared an interim dividend of 9d. per £1 Ordinary share against 6.4d. last year.

Albright and Wilson Ltd. The authorised capital of the company is to be increased from £9 million to £12 million and one fully-paid 5s. ordinary share (to be converted into stock) is to be issued for every four 5s. ordinary stock units held by stockholders on the register on September 4.

People

P. R. Cuthbert, M.P.S., has been appointed regional manager of Evans Medical Ltd. responsible for the activities of medical representatives in Southern England.

W. A. Faure, acting on medical advice, has resigned his appointments as a director of Unilever Limited and Unilever N.V.

R. Levin, F.P.S., has joined Aspro-Nicholas Ltd. as a member of the Development Planning Department. Prior to this he was with the Distillers Co. (Biochemicals) Ltd.

Lord Heyworth, chairman of Unilever Ltd., and Unilever, N.V., is to retire from the boards of both companies at their annual meetings which will probably be held in April next year. As Geoffrey Heyworth, he joined Lever Brothers in 1912 and was made a director in 1931. The merger with Unilever took place in 1937 and in 1942 he became chairman of Unilever and Lever Brothers (Unilever since 1952).

Norman Moulson has been appointed assistant sales manager of British Cod Liver Oils Ltd. He is a member of the Incorporated Sales Managers' Association and has extensive sales and sales management experience in the pharmaceutical field.

At the annual general meeting of the British Standards Institution **R. E. Huffam** was re-elected for a second term of office as the Institution's president. Until his recent retirement he was United Kingdom co-ordinating director of Unilever Ltd.

Frank A. Mackey and **Jack H. Palmer** have been appointed by Riker Laboratories Ltd. as their first overseas representatives.

Mr. Mackey, formerly with Abbott Laboratories Ltd., is covering the Caribbean area, consisting of the British West Indies, Bahamas, Bermuda, British Guiana and British Honduras.

Mr. Palmer, formerly with C. L. Bencard Ltd., is taking over the South-east Asia area and will be working in Singapore, Malaya, Ceylon, Burma and Hong Kong.

Gordon W. Nosotti has joined the Warner - Hudnut - Lambert group to head their export division and supervise overseas operations in pharmaceuticals and cosmetics.

Before joining the Warner-Hudnut Group Mr. Nosotti worked for Johnson and Johnson Ltd.

N. Moulson

G. J. McAlpine

The Crookes Laboratories Ltd. announce that **Neil A. Campbell,** a solicitor, living at Twitten, Wallcrouch, Ticehurst, Sussex, has joined the board and has been appointed chairman with **Viscount Furness** as deputy chairman. Mr. Campbell succeeds **Capt. R. C. Kelly,** who recently died after being chairman of the company for 38 years.

Evans Medical Ltd. announce that **S. L. Maguire** has been appointed deputy general manager of their London House, Ruislip.

The following appointments have been made by Carbide Industries Ltd., a member of the British Oxygen Group of Companies, at their carbide and acetylene factory at Maydown, near Londonderry. **Dr. T. W. T. Baillie,** B.SC., PH.D., production manager, **W. W. Ringland,** B.SC., A.M.I.CHEM.E., chief works engineer, **A. R. Robertson,** commercial manager, and **Dr. R. D. Thrower,** B.SC., PH.D., works research and development manager.

P. G. E. Warburton has resigned as managing director of the Warner-Lambert-Hudnut group of companies (subsidiaries of Warner-Lambert Inc. of New Jersey) and is succeeded by W. J. Lloyd, until recently director of sales of the Aspro-Nicholas group. Mr. Warburton will continue as chairman. He has held both positions for the past 14 years. Before World War II, he was European manager for the Vick Chemical Co. and, immediately after the war, he was the vice-president of the American Home Products export organisation in New York.

K. J. Golds has also retired from the board of the Warner-Hudnut-Lambert Group. He is succeeded as director of administration and secretary by **R. F. Caldersmith,** who held this appointment for some years before going to the headquarters of the Group in New Jersey for three years. Mr. Golds has been a director of the U.K. companies since their foundation in 1932, when he came from the branch in France, where he had been for eight years.

G. J. McAlpine of Benger Laboratories Ltd. has been appointed sales manager. Mr. McAlpine, who studied medicine at Glasgow University, joined the company in 1956 as a medical representative. Early last year he made an extensive tour of the Middle East promoting Benger products, and shortly after his return was appointed field manager.

Robert Nigel Bruce, who has been deputy chairman of the North Thames Gas Board since 1956, succeeds **W. K. Hutchison** as chairman of the South Eastern Gas Board at the beginning of next year. Mr. Hutchison is to become deputy chairman of the Gas Council.

F. H. Braybrook, until recently general manager of Petrochemicals Ltd. (An associate of Shell Chemical Co. Ltd.), has taken up a senior appointment in the group responsible to the director of Coordination Chemicals in Shell International Chemical Co. Ltd. Mr. Braybrook joined the Shell Group in 1929 and has been associated with the development of chemicals from petroleum since this began in the United Kingdom during the last war. He was general manager of Shell Chimie, Paris, from 1950 to 1955, becoming general manager of Petrochemicals Ltd. in 1955.

As a result of recent organisational changes within Shell Chemical Co., Mr. Braybrook's functions as general manager of Petrochemicals will in future be the responsibility of the management of Shell Chemical Co.

OBITUARY

Prof. Sir Ian Heilbron, D.S.O., F.R.S., died recently at the age of 72. He held the chairs of organic chemistry at Liverpool from 1920 to 1933, at Manchester from 1933 to 1938, and at the Imperial College of Science and Technology, London, from 1938 to 1949. Sir Ian became the first director of the Brewing Industry Research Foundation in 1949, a position he held until 1957. From 1939 to 1942 he was scientific adviser to the Department of Scientific Research of the Ministry of Supply, and from 1942 onwards was one of the three scientific advisers to the Minister of Production. It was during this period that he recognised the potential value of D.D.T. From 1950 until 1954 Sir Ian was the chairman of the Advisory Council for the Department of Scientific and Industrial Research.

Sir Ian made notable contributions to the chemistry of the vitamins of the A and D groups, and also initiated research in this country on polyenes and steroids. He was knighted in 1946.

News from Abroad

AUSTRIA

Dragoco buys Schimmel

Dragoco Ltd. of Holzminden took over all the shares in Schimmel and Co. Ltd. of Wien-Liesing in September. The business will probably be run under the name of "Dragoco—formerly Schimmel and Co. Ltd., Vienna." Dragoco's distributing agency in Vienna, Messrs. Teutsch will be dissolved and the new subsidiary will represent Dragoco in Austria. It will deal with Dragoco products in addition to the long-established Schimmel qualities.

SOUTH AFRICA

Phosphate industry planned

The Fosker phosphate undertaking has been established on a pilot-plant basis to find out whether the phosphate deposits justify full-scale exploitation. Prospecting and field exploration has shown that enough raw materials are available to enable Fosker to supply the whole of the present superphosphate needs of the South African farmers. Fosker has overcome technical difficulties in producing a phosphate concentrate suitable for making superphosphates equal to those made from phosphates imported from Morocco.

Its directors have therefore asked for Parliamentary approval to plans to expand its production so that in about three years' time it could produce enough phosphates to meet the Union's present annual consumption. Consumption is expected to increase because of progress in agricultural production methods. If Fosker is allowed to develop as planned, it could in three years become one of South Africa's most important strategic industries. Because the Union could not import rock phosphates in World War II, its soil was so badly starved that it took five years or longer to restore its fertility.

New fertiliser factory

At the opening of the new Fison fertiliser factory near the oil-from-coal plant in the Orange Free State, the chairman of the Fison group of companies said that in these days of intense competition in the world's markets it was essential that the fertiliser industry as well as the farmer keep their costs down. This the farmer could do by increasing his yield per acre with good farming practices, which included adequate fertiliser dressings. In the past, the fertiliser factories had been built at the coast, and many people had wondered why his company should choose to be the first to select an inland site. There were three main reasons for this: It was nearer to some of the home-produced raw materials; it was next to the Sasol oil-from-coal plant, with which his company had an excellent working arrangement to supply each other with certain basic requirements; the third and most important reason was that Sasolburg was in the middle of the maize triangle, which meant that the company could get its products to the farmer faster and in better condition than if they had to come from farther away.

The South African Minister of Economic Affairs said that reference to the yields of agricultural crops in the Union revealed that, with the possible exception of potatoes, kaffir corn and sugar-cane, there had only been a modest increase in average yield per morgen since 1917-18 in respect of most important crops, such as maize and wheat, which together constitute about 75% of available food supplies of vegetable origin. Any increase in food production to keep pace with the growing demands of the population would therefore have to be attained largely by increasing the yield per morgen, and experience had shown that the greatest single factor in obtaining increased crop yields was the correct and adequate use of fertiliser.

In many countries consumption of nitrogen and potash approached the same level as phosphate, whereas in the Union it is only one-quarter and one-fifth of the P_2O_5 consumption. They can be applied to the soil as a straight fertiliser.

MEXICO

First citric plant

Industrias Quimicas de Mexico S.A. is building a plant to produce citric acid. It will be sited close to a major sugar-producing centre to ensure ample raw material supplies and it is anticipated that it will be in full production by next spring. The plant, the first fermentation citric acid unit in Mexico, will produce enough to supply the country's total needs.

Industrias Quimicas is one of the major chemical companies in Mexico. Head offices of the firm are at Morelia. Carbon bisulphide and sulphuric acid plants are located at Morelia and Zacapu.

The American firm Stauffer Chemical Co. holds a 36% interest in the Mexican company. The citric acid process, which will be the basis of the new operation, was developed by Stauffer, and they will work with Industrias Quimicas on building the plant.

ISRAEL

Drug export combine

An export firm representing 80% of Israel's drug producing capacity has been set up. The new company, which unites eight leading manufacturers, will operate under a common trade-mark. Pharmaceutical exports have fallen from $2·5 million in 1957 to only $800,000 in 1958.

New antibiotic

Hebrew University scientists have developed a new antibiotic, heptamycin, for use against yeasts and fungi, and its potential effectiveness is now being tested.

The investigation was launched four years ago when Prof. M. Aschner, then associate professor of bacteriology at the Hebrew University, accidentally discovered a streptomyces with strong antibiotic properties. He left the investigation of these properties to one of his assistants, Dr. Y. Henis, and when Prof. Aschner moved to the Technion in Haifa the general supervision of the project passed into the hands of Prof. N. Grossowicz.

The investigations have been aided by a grant from the Teva Pharmaceutical Works, which is interested in the commercial production of heptamycin and has undertaken to carry out the clinical tests.

UNITED STATES

Research on baldness, grey hair and wrinkles

A laboratory that will conduct research on problems of baldness, greying hair and skin wrinkles was opened on September 21 by the Colgate-Palmolive Co. at New Brunswick, New Jersey. The new Biological Research Laboratories are located on the banks of the Raritan river near Rutgers University. The staff will work in this one-storey, 11,000 sq. ft. building until the completion a few years hence of a projected multi-million dollar Colgate-Palmolive Research Centre on a site adjacent to the Rutgers Science Campus.

Among the problems to be attacked is the cause of so-called "normal" baldness, characterised by the gradual loss of hair in advancing age.

Colgate scientists will also study the complex steps leading to the body's formation of hair pigments in hopes that the greying of hair may some day be modified or controlled.

Studying the changes in normal skin that occur with advancing age, Colgate also hope to discover why the skin wrinkles. They think that wrinkles are a surface manifestation of changes occurring within the skin.

To honour the 50th anniversary of Max Factor and Co. the cosmetic industry of California organised a banquet during which a gold plaque was presented to the company. In this picture the president of the California Cosmetic Association, Mr. D. A. Breyer (*right*) is presenting the plaque to Mr. Max Factor, president of the company, with Mr. Davis Factor, the chairman, looking on.

In addition, the basic research programme will include a study of perspiration—about which surprisingly little is known—as well as enzyme and pharmacological investigations related to the company's broadened interest in the health field. Radioactive isotopes will be among the techniques used.

Solvents from lignin

Crown Zellerbach Corporation will build a new large-capacity plant for production of dimethyl sulphoxide at Bogalusa, Louisiana. It will be sited near Crown Zellerbach's large paper mill at Bogalusa, will start up early in 1960 and have an annual capacity of 5 million lb. of DMSO. To supply the DMSO plant a 10 million lb. per year dimethyl sulphide plant will be built nearby. Dimethyl sulphide is derived from kraft lignin.

Dimethyl sulphoxide is a powerful solvent used as a spinning solvent for polyacrylonitrile fibre, as a solvent in the manufacture of several agricultural chemicals, as an impregnating solvent, as an ingredient in industrial cleaners, and for cleaning moulds. Potential uses include the manufacture of paint strippers and formulations, acetylene and aromatic hydrocarbons.

The process by which the sulphoxide will be manufactured is owned by a Swedish firm, but Crown Zellerbach has secured exclusive licences for making it in the U.S. and Canada. The process consists of a liquid phase oxidation of dimethyl sulphide using air or oxygen in the presence of oxides of nitrogen as catalysts.

In addition to dimethyl sulphide and DMSO, the new facilities will also produce 1 million lb. of methyl mercaptan (MM) each year.

THAILAND

Pharmaceutical industry planned

The Minister of Industry has signed agreements with Merck Sharpe and Dohme, of the U.S.A., and with Dumex Ltd., of Denmark, for the setting up of factories in Thailand. Construction is expected to start soon and production is planned for early 1960.

BELGIUM

S.K.F. distributors

Smith Kline and French Laboratories, Philadelphia, have acquired a minority interest in Récherche et Industrie Thérapeutiques S.A., Genval, Belgium, producers of antibiotics and vaccines.

R.I.T. will take over the distribution of S.K.F. products in the Benelux countries.

ITALY

Price's new agents

Price's (Bromborough) Ltd. have appointed Beghe and Chiapetta, Via Isonzo 25, Milan, as the selling agents in Italy for their stearines, oleines, fatty acids, cloth and textile oils, and fatty alcohols.

ARGENTINE

Essential oil industry

The Argentine essential oil industry has developed substantially within the last few years and is now established on a firm basis, according to Dr. E. Guenther of Fritzsche Brothers, Inc. Oil of peppermint (*Mentha piperita L.*) is the most valuable oil produced and at present about 2,500 acres are planted, yielding in good years from 75,000 to 90,000 lb. of oil, more than sufficient for the domestic market. About 85-90% is produced by Cultivos Industriales S.A., in the Department of Tunyan. There are about 40 planters in this region, with eight distilleries. Yields per acre vary considerably; some years ago yields of 50-60 lb. per acre were obtained, with more recently average yields of 40-45 lb. In the last two years the yield has decreased further.

The Japanese mint, *Mentha arvensis*, is also grown, a total of some 2,000 acres now being under cultivation. Annual production is roughly 75,000 lb. of oil. Mint oil from *Mentha arvensis* is the principal raw material for the isolation of menthol. Isolation of the menthol from the crude oil is carried out in Buenos Aires, and total production of menthol in Argentina amounts to approximately 33,000 lb. Crude peppermint oil is also processed in Buenos Aires, and in recent years a part of the production has been exported to adjacent South American countries and to Europe and Israel.

MEETINGS

Royal Institute of Chemistry

November 5. "Recent Developments in Co-ordination Chemistry," by Prof. R. S. Nyholm. 6.30 p.m. Brunel College of Technology, Woodlands Rd., London, W.3.

November 9. "The Search for New Drugs," by Dr. F. L. Rose. 6.45 p.m. Woolwich Polytechnic, Thomas Street, London, S.E.18.

November 12. "The Silicones," by Dr. F. C. Saunders. 7 p.m. Croydon Technical College, Fairfield, Croydon.

November 18. Annual general meeting. 6 p.m. Shell Mex House, Strand, London, W.C.2.

November 23. "Chemistry in Veterinary Science," by S. L. Hignett. 7 p.m. North-west Kent College of Technology, Miskin Road, Dartford.

November 25. "New Developments in the Chemistry of Free Radicals," by Prof. F. S. Dainton. 7 p.m. South-west Essex College of Technology, Forest Road, London, E.17.

Society of Chemical Industry

November 2. "Chemical Research in Germany," by Dr. O. Horn. 6.30 p.m. 14 Belgrave Square, London, S.W.1.

Society for Analytical Chemistry

November 12. "Identification and Determination of Phenols," by Dr. L. Barker. 6.30 p.m. The University, Birmingham 3.

November 13. "Techniques in Radiochemistry for Analysis and Research," by D. A. Lambie. 7.15 p.m. Royal College of Science and Technology, Glasgow.

Packaging

Pocket-size vial

Pocket-size pill vials moulded in one piece from Union Carbide polyethylene have cap, body and flexible hinge all moulded simultaneously. The vials can be marked with stick-on labels, hot stamp, printing, or silk screening.

The vial is manufactured in about 2, 8, 16, 28 and 40 g. sizes.

★

Lipstick container

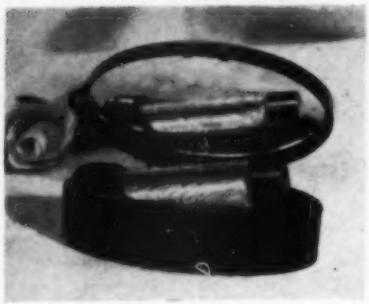
A new style of lipstick container has been introduced by Max Factor Hollywood and London (Sales) Ltd. *Hi-Style* is an oval compact which holds the lipstick in a tilted position and has a mirror inside the lid. Available in black or tortoiseshell, the container has a gilt Florentine design on the lid.

★

Drums for corrosives

A container which is said to combine the chemical resistance of polyethylene with the strength of a steel drum is available from Metal Containers Ltd. In it the outer container is manufactured from steel with a double seamed bottom, welded side seam and fully open top with curled edge. The removable lid, secured by a bolt-type closing ring, allows removal of the semi-rigid moulded polythene inner drum for inspection or replacement. It is supplied with buttress threaded combination bungs for use with draw-off taps.

A range of alternative types of outer containers manufactured from 14 BG to 20 BG is available and may be supplied with solid "I" section rolling hoops and reinforced bottoms if required.



Hi-Style lipstick container by Max Factor

Calculator pack

The *Preludin* overweight calculator's construction is an example of packaging techniques being applied to other uses by the Metal Box Co. Ltd. *Preludin* is a drug for controlling the appetite of those who have to diet for their health, and the calculator is said to provide the doctor with a rapid and accurate way of finding whether a patient's weight is normal or excessive in relation to age, sex and height.

The instrument is made entirely of plain board tube and tinplate, and consists of two composite container bodies with overall paper labels, the one telescoped into the other to give a revolving fit. The outer end of each tube is fitted with a tinplate slip lid, which is pierced to prevent a pressure-build-up when the calculator is being telescoped.

The fixing on of the labels has been done with great precision, so that the figures of the tables on the inner tube correspond exactly with the indicator apertures in the outer tubes. It is attractively produced in red, black and blue.

The Preludin overweight calculator

Lotion in polythene bottle

A new healing antiseptic skin lotion marketed by Care Laboratories Ltd. is packed in a 28 c.c. Poly-Tainer polythene bottle made by the Plastics Group of the Metal Box Co. Ltd. The Poly-Tainer is of natural polythene and a special dropper plug, combined with the squeeze action of the container, is claimed to give easy controlled dispensing of the lotion.

The container is printed with the brand name in white on a blue panel, and is fitted with a white polystyrene screw cap. It is packed for sale in a cardboard outer overwrapped with cellulose film.

★

Thinwall polythene bottles

Poly-Tainer plastic bottles in high density polythene are available from the Plastics Group of the Metal Box Co.

These are said to have greater resistance to detergents, oils and chemicals than those made of conventional (low density) polythene and also to have lower gas permeability and to be efficient for perfumed products such as many cosmetics and talcum powders.

A production advantage claimed is that the bottles can be made with a thinner wall because of the high rigidity of H.D. polythene. This results in a saving of material eading to overall economies in manufacture, despite the fact that high density polythene is slightly more expensive than conventional polythene.

As with conventional *Poly-Tainers* the packs can be made in a wide range of colours, and can also be embossed and multicolour printed.

★

Wrapping aid renamed

The BCL Wrapping Aid (Series II) has been renamed the BCL Carton Wrapping Aid. This will avoid the possibility of confusion with other devices for wrapping and heat-sealing *Cellophane* and BCL polythene films.

The aid facilitates the manual application of heat-sealed *Cellophane* film overwraps to cartons. It is claimed to make it unnecessary to turn the cartons at any stage in the wrapping operation.

★

Fields' London showroom

J. C. and J. Field Ltd. have opened a new showroom at 9a New Bond Street, London, W.1. They are exhibiting a new range of gift *Coffrets* containing selections of the company's soaps, talc, bath cubes and perfume sticks. A feature of the talc is that it is blended with a deodorant. All the products are available in three different fragrances: French Pink, French Flowers and French Moss.

New Products

Hypotensive

Duncan, Flockhart and Co. Ltd. have developed a new hypotensive said to have particular applications in surgery. Named *Trophenium*, it is a synthetic derivative of atropine, and in developing it the company achieved the first successful commercial synthesis of atropine.

Fungistats

Smith and Nephew Pharmaceuticals Ltd. have introduced, under the name *Amoral*, a gel, cream and dusting powder for the treatment of fungal infections. The gel, which has an alcoholic base, is said to be effective for most tinea infections, especially athlete's foot, while the cream is designed for dry, scaly or raw lesions. Both contain amyloxybenzamide, amyloxyacetophenone and salicylic acid as the active ingredients. The dusting powder incorporates hexachlorophene and is for concurrent use and to prevent reinfection.

The gel and cream retail in tubes of 25 g. at 5s. 3d. each, inc. tax, and the dusting powder retails in a 40 g. polythene puffer pack at 7s. each, inc. tax.

Improved dyes for nylon

An entirely new class of disperse dyes, said to bring the dyeing of nylon to the same level of development as that reached in the wool and cellulosic fibre dyeing fields is available from Imperial Chemical Industries Ltd. The initial four *Procinyl* dyes are claimed to display on nylon and other polyamide fibres the desirable attributes of the established disperse dyes, and are applied in a similar manner. The essential difference is that the dyes are applied initially under slightly acid instead of neutral conditions, and that dyeing is completed by an alkaline fixation stage during which certain reactive groups in the dye molecules react chemically and irreversibly with the amine or amide groups in the polyamide fibre and so produce dyeing of high wet fastness. Yellow, orange, scarlet and blue dyes are the four at present available. They are inter-compatible, so many shades can be produced.

Antidepressive

A new therapeutic agent which may, it is stated, " reduce or even supplant the use of electroshock " in the treatment of severe depressive states has been developed by William R. Warner and Co. Ltd. The drug is *Nardil*, an inhibitor of mono amine oxidase activity, and it is said to compare favourably with electroconvulsive therapy in its field of usefulness and speed of action, to be free from serious side effects and to have low toxicity.

Nardil (phenelzine dihydrogen sulphate) is available as orange-coated tablets for oral use. Each tablet contains 15 mg. of β-phenylethylhydrazine as the dihydrogen sulphate. Dosage suggested is 75 mg. per day for hospital in-patients and 1 tablet three times a day for outpatients.

Prices per bottle of 100 and 500 tablets are 23s. 5d. and 97s. 10d., tax excluded, respectively.

The company has also introduced *Ecomytrin* ointment for the treatment of bacterial skin infections. The ointment contains amphomycin 0·5%, and neomycin B base 0·33% in a non-greasy oil-in-water base. It is available on prescription only. Trade price is 60s. per doz., exempt tax.

Oil of Ulay

Oil of Ulay, said to be a completely new skin food in Britain, is being distributed by Biometica Ltd.

It is claimed to protect and nourish dry skins, to act as a powder base and prevent clogging of the pores. A 4 oz. bottle retails at 15s.

Combined hypotensive

A combined hypotensive, *Serpasil-Esidrex*, from Ciba Laboratories Ltd., is said to be suitable for all types of hypertension. Each tablet contains 0·15 mg. reserpine and 10 mg. hydrochlorothiazide, and recommended dosage is 2-3 tablets daily.

The product is said to be particularly suitable for long term treatment, since full clinical response can be maintained over long periods without increasing the dose.

NEW COMPANIES

These particulars of new companies have been extracted from the daily register of Jordan and Sons Ltd., company registration agents, Chancery Lane, London, W.C.2.

Semiconductor Thermoelements Ltd. 10.8.59. 93-97 Regent St., London, W.1. Mnfrs. of and dlrs. in and licensees of and gnl. research establishment for pure elements and chemical compounds, etc. £100. Dir.: A. Gelbtuch.

Vale Pharmacy Ltd. 13.8.59. 246 Middleton Rd., Manchester 8. Chemists. £100. Dir.: N. Auerbach.

Robert E. Pearce (Cliff Road) Ltd. 13.8.59. 2 Cliff Rd., Newquay, Cornwall. Wholesale retail consulting, analytical, mnfg. and pharmaceutical chemists. £5,000. Permnt. dir.: M. P. Elford.

N. A. Exelby Ltd. 13.8.59. 1 Wembley Hill Rd., Wembley, Middx. Dispensing chemists. £1,500. Dir.: N. A. Exelby.

Reddish Detergents Ltd. 14.8.59. Globe Works, Starley Rd., Cheadle Hulme, Ches. £500. Permnt. dir.: W. J. Hipkins.

Bracey Baring (Chemical Developments) Ltd. 14.8.59. The Cottage, Hunton, Sutton Scotney, Hants. £100. Dir.: P. Bracey.

McKee Head Wrightson Ltd. 18.8.59. Bus. of inventing, designing, engineering and constructing plant and equipment for the production of substances to be marketed as chemical products or for use in the chemical or petroleum industries. £100. Sub.: G. Treadwell, 264 Hurst Rd., Bexley, Kent.

Boileau and Boyd (U.K.) Ltd. 17.8.59. West Ave., Talke, Kidsgrove, Staffs. Chemists. £100. Dir.: D. B. P. Boyd.

J. J. Taylor (Chemists) Ltd. 19.8.59. £5,000. Dir.: J. J. Taylor, 6 Dorset Rd., London, S.W. 19.

Blackbird Fertilisers Ltd. 20.8.59. 14 Clifford St., London, W.1. £1,000. Dir.: C. Black.

Therapharm Ltd. 24.8.59. Penrhyn Hse., Penrhyn Rd., Kingston-on-Thames. Chemists. £1,000. Dir.: A. J. Mould.

M. Frieze (Chemist) Ltd. 24.8.59. 60 Brunswick St., Manchester 13. £500. Dir.: M. Frieze.

G. Grant Wilson Ltd. 25.8.59. 12 Prentice Place, Potter St., Harlow, Essex. To take over bus. of chemist ed. on at Harlow by G. G. Wilson, etc. £100. Dir.: G. G. Wilson.

L. S. Freedman (Chemists) Ltd. 25.8.59. 3 Marsden St., Manchester 2. £1,000. Dir.: L. S. Freedman.

Rayne Foster Ltd. 25.8.59. 184-6 Bath Row, Birmingham 15. Chemists. £500. Dir.: H. Rayne.

S. T. Treharne (Chemists) Ltd. 25.8.59. 18 Dunraven Place, Bridgend, Glam. £7,000. Dir.: S. T. Treharne.

Mid-Surrey Agricultural Fertilisers Service Ltd. 31.8.59. Cattle Market, Woodbridge Rd., Guildford. £10,000. Dir.: R. K. Jones.

Williams Ansbacher Ltd. 31.8.59. Mnfrs. of and dlrs. in aniline dyes, organic pigments, etc. £20,000. Sub.: M. Simmons, 59-67 Gresham St., London, E.C.2.

Chattem Chemicals Ltd. 31.8.59. Chemical mnfrs. £1,000. Sub.: J. D. Eccles, 85 London Wall, London, E.C.2.

C. Broadway Ltd. 10.7.59. 68 Euston Ave., Watford. Chemists. £3,000. Dir.: C. Broadway.

Mast Laboratories Ltd. 10.7.59. 128 Longmoor Lane, Liverpool 9. Mnfrs. of preparations for carrying out multi-coloured antibiotic sensitivity tests, etc. £1,000. Dir.: A. E. Brookfield.

Lowe and Lucas Ltd. 13.7.59. 23 Hollyfield Rd. South, Sutton Coldfield. Chemists. £1,000. Dir.: W. W. Lowe.

J. C. Duffy Ltd. 14.7.59. 17 Brandon St., Birkenhead. Chemists. £1,000. Dir.: J. C. Duffy.

Boyce and Long Ltd. 8.6.59. To take over bus. of pharmaceutical chemists ed. on at 402 Cottingham Rd., Hull, by S. T. Boyce, etc. £5,000. Dir.: S. T. Boyce.

J. Glassman Ltd. 16.7.59. 80 Cheapside, London, E.C.2. Chemists. £1,000. Dir.: J. D. Glassman.

THE CHEMICAL MARKET

OILS AND WAXES FLUCTUATE

LONDON.—Refined deodorised **palm kernel oil** in 2-ton lots is up again, this time by £9 to £159 per ton. Sudan spot **beeswax** has increased by 25s. to £25 10s. per cwt. Prime spot **carnauba** is up by £1 to £48 per cwt., **gum arabic** lump by 10s. to £10 5s. per cwt., and **shellac** Nos. 1 and 2 orange both by 10s. to £14 and £12 per cwt. respectively. Refined deodorised **palm oil** in 2-ton lots has decreased by £1 to £103 per ton, **agar agar No. 1,** both Kobe and strip, by 1s. to 14s. and 19s. per lb, respectively, **carnauba** fatty grey by 10s. to £30 10s. per cwt., and **Peru balsam** by 3s. to 10s. 6d. per lb. **Silver nitrate** in 500 g. lots has increased by $\frac{1}{16}$d. to 5s. $2\frac{5}{16}$d. per oz.

FINE CHEMICALS

Acetanilide 12½ kg. 7s. 4d. kg.
Arsenious oxide B.P.
7-lb. lots 1s. 9d. lb.
1-cwt. lots 1s. 2d. lb.
Ascorbic acid
100 kg. £4 14s. kg.
Aspirin
56 lb. 5s. 2d. lb.
1-cwt. 4s. 11d. ,,
5-cwt. lots 4s. 9d. ,,
Atropine
Sulphate, 500 g. £59 18s. 6d. kg.
Alkaloid, 500 g. £68 15s. kg.
Benzene B.P.C. 28-lb. lots 1s. 8d. lb.
Benzoic acid 12½ kg. 7s. 4d. kg.
Benzyl benzoate
According to pack 5s. to 7s. 2d. lb.
Bismuth oxide B.P.C. 1934
28-lb. lots 26s. 10d. lb.
Bismuth salts 28-lb. lots:
Carbonate 22s. 3d. lb.
Subgallate 21s. 1d. ,,
Salicylate 21s. 9d. ,,
Subnitrate 20s. 5d. ,,
Borax B.P.
Powder £57 10s. ton
Extra fine £58 10s. ,,
Boric acid B.P.
Crystal £84 10s. ,,
Powder £91 ,,
Bromine B.P.C. 7-lb. lots 6s. lb.
Caffeine 50 kg. 42s. 6d. kg.
Calamine 50 kg. 4s. kg.
Calcium gluconate
1 cwt. lots dlvd. 3s. 7d. lb.
Calcium glycerophosphate
50 kg. 28s. 6d. kg.
Calcium lactate B.P.
7-lb. lots 2s. 11d. lb.
1-cwt. lots 2s. 4d. ,,
Chloral hydrate 50 kg. 10s. kg.
Citric acid, B.P. Powder or granulated:
1-cwt. lots £11 5s. cwt.
5-cwt. lots £11 ,,
Codeine
Alkaloid 100 g. £138 10s. kg.
Phosphate 100 g. £110 ,,
Cream of tartar
1-cwt. lots £11 12s. cwt.
5-cwt. lots £11 9s. ,,
Ephedrine
Hydrochloride 3 kg. £7 1s. 1d. kg.
Alkaloid 3 kg. £12 7s. kg.
Sulphate 3 kg. £7 1s. 1d. ,,
Eucalyptol
1-cwt. lots 11s. lb.
5-cwt. lots 10s. 6d. ,,
Ferri ammonium citrate B.P.
1-cwt. lots, scales 4s. 7d. lb.
1-cwt. lots, granules 3s. 9d. ,,
Ferrous gluconate
1-cwt. lots dlvd. 6s. 3d. lb.
Gallic acid B.P.C.
1-cwt. lots 10s. ,,
Gluconic acid technical 50%
Minimum 12-gal. drums
19s. gal., drums extra, returnable
Glucono delta lactone
1-ton lots dlvd. 5s. net lb.
Glycerophosphoric acid
24 litres 11s. 10d. litre
Glycine (amino acetic acid)
12½ kg. 18s. 10d. kg.
Hexyl resorcinol 10 kg. £7 10s. kg.
Hydroquinone 12½ kg. 23s. 10d. kg.
Iodides
Ethyl 4 kg. bottles 62s. 9d. kg.
Mercury, red B.P.C.
12½ kg. lots 61s. 3d. ,,
Potassium B.P.
12½ kg. lots 15s. ,,
Sodium B.P.
12½ kg. lots 21s. 6d. ,,
Iodine, Chilean crude,
99% min. in wooden casks 15s. kg.
Iodoform
12½ kg. and under 50 kg. 42s. 6d. kg.
Lactose 50 kg. 3s. 2d. kg.
Lithium salts 5-cwt. lots
Benzoate 10s. lb.
Carbonate B.P.C. 11s. 3d. ,,
Chloride (commercial) powder
11s. ,,
,, granular 10s. 9d. ,,
Hydroxide 9s. 9d. ,,
Citrate B.P.C. 9s. ,,
Sulphate 8s. 6d. ,,
Salicylate, 10 cwt., dlvd. 9s. 9d. ,,
Magnesium carbonate B.P.
Light cwt. lots dlvd. £129 ton
Magnesium trisilicate 28-lb. packs
28-lb. lots 4s. 3d. lb.
1-cwt. lots 3s. 10d. ,,
5-cwt. lots 3s. 7d. ,,
Bulk rates for larger quantities are from 3s. 1d. lb. in 1-ton lots
Manganese hypophosphite B.P.C.
7-lb. lots 13s. 11d. lb.
1-cwt. lots 12s. 11d. ,,
Mercuric chloride B.P.
50-kg. lump 48s. 6d. kg.
Methyl salicylate 1-cwt. lots 3s. 3d. lb.
Morphine
Alkaloid, 100 g. £138 18s. 4d. kg.
Nicotinamide 1 kg. £3 kg.
Nicotinic acid
12½ kg. 33s. 9d. kg.
1 kg. 36s. ,,
Oleine, B.P. extra pale, 3/4 cwt. drums returnable carriage paid G.B.
£160 ton
Phenolphthalein 50 kg. 24s. 3d. kg.
Phosphoric acid B.P.
(s.g. 1·750) 10-carboy lots 1s. 4d. lb.
Potassium permanganate B.P.
1-cwt. lots dlvd. 1s. 11¼d. lb.
Procaine hydrochloride (foreign) 2 kg.
59s. kg.
Quinine 1-oz. lots 4s. 4d. oz.
Riboflavin
100 g. 5½d. g.
10 g. 7d. ,,
Saccharin
500 g. £7 4s. for this quantity
Salicylic acid
B.P., dlvd. 3s. 2½d. to 5s. 6d. lb.
Silver nitrate
500 g. 5s. $2\frac{5}{16}$d. oz.
Sodium benzoate B.P.
1-cwt. lots 2s. 9½d. lb.
1-ton lots 2s. 7½d. ,,
Sodium gluconate technical
3-cwt. lots dlvd. 3s. net lb.
Sodium salicylate
50 kg. 8s. 8d. kg.
12½ kg. 9s. ,,
Sodium thiosulphate
Crystals, photographic quality
1-ton lots 49s. cwt.
Stearic acid B.P.C. flake, carriage paid G.B. £154 ton
Strychnine 25 oz.
Alkaloid 8s. oz.
Hydrochloride 8s. ,,
Sulphate 7s. ,,
Sulphaguanidine
12½ kg. 33s. kg.
50 kg. 32s. ,,
Sulphanilamide
12½ kg. 16s. 6d. kg.
50 kg. 15s. 4d. ,,
Sulphathiazole 12½ kg. 39s. 9d. kg.
Tannic acid B.P. Levis
1-cwt. lots 10s. lb.
Tartaric acid B.P.
Powder or granulated,
10 cwt. or more £15 cwt.
Terpineol B.P.
40-gal. drums 2s. 4½d. lb.
1-cwt. lots 2s. 7d. ,,
Theophylline B.P.
500 g. 27s. 6d. for this quantity
Thiamine hydrochloride
100 g. 4d. g.
1 kg. £11 15s. kg.
Thioglycollate
Ammonium 12s. 4d. to 16s. 4d. lb.
Calcium:
7-lb. lots 17s. 3d. ,,
5-cwt. lots 14s. 3d. ,,
α-Tocopherol 25-g. lots 1s. g.
Vanillin 23s. 6d. to 30s. 6d. lb.
Zinc oxide B.P.
2-ton lots £116 ton

GENERAL CHEMICALS

Acetic acid 1-ton lots dlvd.
80% Technical £99 ton
80% Pure £105 ,,
Glacial B.P. £114 ,,
99-100% Glacial £111 ,,
98-100% Glacial £108 ,,

Acetic anhydride
1-ton lots dlvd. £128 ton
Acetone
5-gal. drums, free, non-returnable £128 ton
40 to 45-gal. drums, 10-ton lots £88 „
Alum, potassium granular crystals
50 kg. 1s. 2d. kg.
Aluminium hydroxide B.P.C. 34
28-lb. lots 2s. 4d. lb.
Aluminium stearate
(Precipitate) 1-ton lots £258 6s. ton
Ammonia
Persulphate £6 13s. 6d. cwt.
Phosphate: Mono- £106 ton
Di- £97 10s. „
Amyl acetate
B.S.S. 10 tons and over £251 ton
Technical £249 „
Amyl alcohol
Technical in 1-ton lots £256 ton
Arsenic White powdered ex store £42 ton
n-Butyl acetate
10-ton lots £173 ton
n-Butyl alcohol
10-ton lots £149 ton
Calcium chloride
Solid 70 to 72%, 8-ton lots dlvd. £15 ton
Calcium oxide (Lime)
Ex marble 28-lb. lots 3s. 10d. lb.
Caustic soda
Solid 1-ton lots, from £37 16s. 6d. ton
Chloroform B.P. ½-ton lots 2s. 11½d. lb.
Chromic acid
Dlvd. U.K. (less 2½%) 2s. 0½d. to 2s. 0¾d. lb.
DDT 3s. 0½d. to 3s. 2d. lb.
2 : 4-Dichlorophenoxyacetic acid
99% pure, 1-cwt. bags £320 ton
Dimethyl sulphate 440 lb. drum lots 3s. 8d. lb.
Ether (Diethyl ether)
Tech. B.S.S. and Solvent B.P. 1-ton lots in drums 2s. lb.
Ethyl acetate 10-ton lots £145 ton
Ethyl alcohol
95% Gay Lussac 66·0 o.p.
2,500 to over 300,000 proof gallons per year in tank wagons 4s. 2¾d. to 4s. 0½d. per proof gal.
Ferrous sulphate 50 kg. 1s. 4d. kg.
Formaldehyde
40% by volume dlvd. England 1-ton lots £38 15s. ton
Glycerin
1·2627 s.g. chem. pure, 5 tons and up, 5-cwt. drums £241 10s. ton
1·2627 s.g. technical grade, 5 tons and up, 5-cwt. drums £236 10s. ton
Hexamine
1-ton lots
Technical, bulk 1s. 8d. lb.
B.P.C. 1s. 11d. „
Hydrochloric acid
Commercial 18s. 6d. cwt.
Hydrogen peroxide
27·5% weight £119 ton
35% weight £143 „
Lactic acid (1-ton lots)
Pale tech. 44% by weight 1s. 3½d. lb.
Dark tech. 44% by weight 9½d. lb.
Magnesium chloride
Solid (ex wharf): 1-ton lots £17 10s. ton
Magnesium sulphate £15 ton
Mercurous chloride (calomel)
50 kg. 65s. kg.
Mercury sulphide, red
Ton lots and over 30s. 6d. lb.
Methylated spirits (Industrial)
Perfumery quality 500 gal. and upwards: gal.
61 o.p. 7s. 2½d.
74 o.p. 7s. 10d.
5 to 10 gal.:
61 o.p. 8s. 8d.
74 o.p. 9s. 3½d.
Methyl ethyl ketone
10 tons dlvd. in drums £143 ton
Methyl isobutyl carbinol
10 tons and up, in drums, dlvd. £163 ton
Methyl isobutyl ketone
10 to 50 tons, in drums, dlvd. £169 ton
Naphthalene
Crystal, dlvd., 4-ton lots, spot £66 ton
Ball and flake (ditto) £86 15s. „
Nickel sulphate
dlvd. ton lots £170 ton
Nitric acid 70% intermediate £32 „
Pentachlorphenol
Flake, technical, 1-ton lots, dlvd. 2s. 2d. lb.
Phenol Crystals:
Under 1 ton dlvd. from 1s. 7d. lb.
10 tons and over dlvd. in returnable drums from 1s. 4½d. lb.
Phthalates
10-ton lots in drums
Diethyl (B.S.) £193 10s. ton
Dimethyl (B.S.) £185 ton
Potassium bromide
50 kg. 5s. 6d. kg.
12½ kg. 5s. 8d. „
Potassium carbonate
Calcined 96 to 98% (1-ton lots ex store) £76 ton
Hydrated (1-ton lots) £74 10s. „
Potassium fluoride
28-lb. lots 5s. 1d. lb.
Potassium sodium tartrate
5-cwt. lots £10 cwt.
Soda ash
1-ton lots dlvd., from £16 11s. 6d.
Sodium cyanide
96-98% £130 ton
Sodium hydroxide 28-lb. lots:
sticks (1-lb. bottles) 4s. 3d. lb.
pellets „ „ 3s. 9d. „
Sodium metal 28-lb. lots 3s. 8d. „
Sodium metasilicate
Dlvd. U.K. in ton lots £26 ton
Sodium phosphate
Dlvd. ton lots: Di-sodium, crystalline £40 10s. ton
Anhydrous £88 „
Tri-sodium, crystalline £39 „
Anhydrous £86 „
Sodium silicate
according to quantity, grade and delivery point
8-ton lots £13 10s. ton
1-ton lots £17 „
Sodium sulphate Ex works:
(Glauber salt) £13 ton
(Salt cake) unground, full truck loads £8 16s. 6d. ton
Sodium sulphide
Broken, returnable drums, dlvd. ton lots £37 2s. 6d. ton
Flake, ditto £38 12s. 6d. „
Solid ditto £36 2s. 6d. „
Sodium sulphite
Commercial crystals 4-ton lots £28 10s. „
(Dlvd. London in 1-cwt. single non-returnable bags)
Sodium tripolyphosphate
1-ton lots £95 ton
Stannic chloride 28-lb. lots 8s. 11d. lb.
Stannous chloride 28-lb. lots 9s. 5d. lb.
Strontium carbonate
96-98% 28-lb. lots 3s. lb.
Sulphuric acid, ex-works, according to quality and quantity
B.O.V. 78% from 8s. to 10s. cwt.
C.O.V. 96% from 11s. to 14s. cwt.
Zinc chloride
28-lb. lots sticks 6s. 9d. lb.

OILS AND FATS

Palm kernel oil
Refined, deodorised, 2-ton lots, naked, ex works £159 ton
Palm oil
Refined, deodorised, 2-ton lots, naked, ex works £103 ton
Stearine
dlvd. free bags
Pristerene 64 flake £148 ton
Pristerene 62 flake £133 „
Pristerene 61 flake £113 „
A premium of £2 ton is charged for powder and £4 for block

GUMS AND WAXES

Agar Agar No. 1
Kobe strip 14s. lb.
Powder 19s. „
Beeswax
Dar-es-Salaam spot (nominal) £26 cwt.
Sudan spot (duty paid) £25 10s. „
Bleached white (slab) £30 „
Refined yellow (slab) £26 10s. „
Benzoin
Sumatra spot £26 10s. cwt.
Siam spot £2 7s. 6d. lb.
Candelilla Spot £23 cwt.
Carnauba
Prime, Spot £48 cwt.
Fatty grey £30 10s. „
Gum arabic Lump £10 5s. cwt.
Karaya Powder, Spot 3s. 8d. lb.
Paraffin wax
1-ton lots, acc. to grade £87 10s. to £120 ton
Peru balsam 10s. 6d. lb.
Shellac
No. 1 orange £14 cwt.
No. 2 orange £12 „
Transparent white 4s. 3d. lb.
Pale dewaxed 6s. „
Tragacanth
No. 1 spot £127 cwt.
No. 2 spot £121 „
Pale leaf £51 „
Amber £38 „
Brown to Red £27 „

NEW PATENTS

COMPLETE SPECIFICATIONS ACCEPTED

Steroids

17 α-methyl-17-hydroxy-5 (10)-estern-3-one. *Searle and Co.* 822,595.

Steroids and the manufacture thereof. *Upjohn Co.* 823,293.

Fertilisers

Granular fertilisers. *Scottish Agricultural Industries Ltd.* 822,653.

Fluid fertilisers. *Scottish Agricultural Industries Ltd.* 823,449.

Antibiotics

Tetracycline antibiotic compositions. *American Cyanamid Co.* 822,422.

Purification of kanamycin. *Bristol Laboratories International S.A.* 823,516.

Method of producing tetracycline. *American Cyanamid Co.* 823,230.

Vitamins

Production of vitamin B_{12}. *F. B. Dehn.* 823,291.

Production of vitamin A acid. *Badische Anilin- & Soda-Fabrik A.G.* 822,685.

Vitamin products and process of preparing same. *Pfizer and Co. Inc.* 822,728.

Fungicides and herbicides

Herbicidal compounds. *Boots Pure Drug Co. Ltd.* 823,208.

Fungicide. *Allied Chemical Corp.* 823,329.

Dyestuffs

Azo dyestuffs derived from dextran. *Commonwealth Engineering Co. of Ohio.* 823,221.

Metallisable monoazo dyestuffs, complex heavy metal compounds thereof, and their use. *Geigy A-G.* 822,734.

Metal complexes of benzene-monoazo-pyrazolone dyestuffs. *Badische Anilin- & Soda-Fabrik A.G.* 823,393.

Disazo dyestuffs derived from 1-phenyl-5-pyrazolone-3-carboxylic acid. *Farbwerke Hoechst.* 814,605.

Polyazo-dyestuffs derived from 3,3¹-dihydroxydiphenylamine and processes for their manufacture. *Farbwerke Hoechst.* 815,737.

Oxdiazole disazo dyestuff and process for their manufacture. *Ciba Ltd.* 816,749.

Stilbene monoazo-dyestuffs and process for their manufacture. *Ciba Ltd.* 814,391.

Metallizable benzene-monoazo-benzene dyestuffs, complex heavy metal compounds thereof, and their use. *Geigy A.G.* 815,790.

Dyestuffs of the auramine series which are soluble in alcohols. *Badische Anilin- & Soda-Fabrik A.G.* 815,966.

Process for the manufacture of vat dyestuffs of the anthraquinone series. *Imperial Chemical Industries Ltd.* 814,619.

Pharmaceuticals

Germicidal agents. *H. Newby.* 823,286.

Indoles and process for their manufacture. *Ciba Ltd.* 822,736.

2 - Chlorophenothiazine derivatives. *Upjohn Co.* 823,470.

Bis - (aminomethyl) - benzene derivatives. *Sterling Drug Inc.* 822,589.

N - substituted - 4 - phenyl - 4 - carboxylic piperidines and the preparation thereof. *British Drug Houses Ltd.* 822,517.

4-Aryl 1-1-(substituted)-piperidine-4-carboxylates and acid addition salts thereof. *Sterling Drug Inc.* 823,413.

Injectable corticotrophin preparations. *Crookes Laboratories Ltd.* 823,445.

Method of extracting products of therapeutic value from the pancreas. *I. Alt.* 822,741.

Hydrazine derivatives and a process for the manufacture thereof. *Hoffmann-la Roche and Co. A.G.* 822,796.

Nicotinoyl-hydrazine derivatives and a process for the manufacture thereof. *Hoffman-la Roche and Co.* 822,696.

Diquaternary salts of aminoalkyl piperidine. *Thomae G.m.b.H.* 823,338.

Therapeutically effective amino-nitriles and method of preparing same. *Kali-Chemie A.G.* 822,695.

Therapeutic compositions containing choline salts of dialkyl xanthines. *Warner-Lambert Pharmaceutical Co.* 823,242.

Alkyl - aminoalkyl - phenothiazines and pharmaceutical preparations containing them. *Ciba Ltd.* 822,618.

Quaternary ammonium compounds related to reserpine and process for their manufacture. *Ciba Ltd.* 822,723.

Production of xanthene derivatives. *Ward Blenkinsop and Co. Ltd.* 822,720.

5 - phenyl - 5 - tertiary - butyl - hydantoin. *Reidel-de Haën A.G.* 823,517.

Immunologic preparations. *National Drug Co.* 823,489.

NEW TRADE MARKS

APPLICATIONS

Cosmetics, toilet preparations

BLUE WOOD.—B782,121. *A. Gainty.*

HI AND DRI.—785,030. *Revlon Inc.*

MASTOCIDE.—788,094. *H. Price.*

AEROFLOR.—788,518. *C. Zimmermann and Co. Ltd.*

SILVIKRIN.—788,708. *County Laboratories Ltd.*

POLYDERM.—788,777. *Chesebrough-Pond's Ltd.*

COTY LONG LAST.—788,905. *Coty (England) Ltd.*

JESOLINE.—789,624. *Jeyes' Sanitary Compounds Co. Ltd.*

OVERNIGHTER.—B772,144. *Lentheric Ltd.*

DEWISHEN.—783,497. *Hans Schwarzkopf.*

SEVEN WONDERS.—785,032. *Revlon Inc.*

MEDIJEL.—785,958. *D.D.D. Co. Ltd.*

KOL-ES-TINT.—786,330. *Wella Rapid Ltd.*

GAYCLENS.—B787,889. *Lee and James Ltd.*

RUE DE LA PINK.—789,188. *Coty (England) Ltd.*

QUEEN OF SCOTS.—789,369. *Soaps and Detergents Ltd.*

ACCLAIM.—B775,930. *Richard Hudnut.*

GLITTER GLO.—775,932. *Richard Hudnut.*

ILLUSION.—B783,500. *Hans Schwarzkopf.*

PARNOSA.—783,633. *Parnosa Laboratories.*

LIQUID ASSET.—785,033. *Revlon Inc.*

CORONETTE.—788,059. *Camilatone Ltd.*

BROGUE.—788,545. *Colloidal Chemists Ltd.*

QUAINTANCE.—790,135. *Avon Products Inc.*

GOOD COMPANIONS.—B790,471. *Cussons Sons and Co. Ltd.*

ELIMIT.—778,277. *N.V. Koninklijke Pharmaceutische Fabrieken V/H Brocades-Stheeman & Pharmacia.*

TOXION.—B780,748. *F. A. Hughes and Co. Ltd.*

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From MANUFACTURING CHEMIST

October 1894

An important antidote

Dr. Antal recommends the use of nitrate of cobalt as a perfectly certain antidote for potassium cyanide. An insoluble double compound is formed in the stomach, and the author of the statement quotes forty cases in which good effects have been produced. It may be mentioned that Dr. Antal was the man who first suggested the use of potassium permanganate for phosphorus poisoning.

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Cetrimide B.P. and related
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Ampholytic and related types
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❋ **COLLONES**
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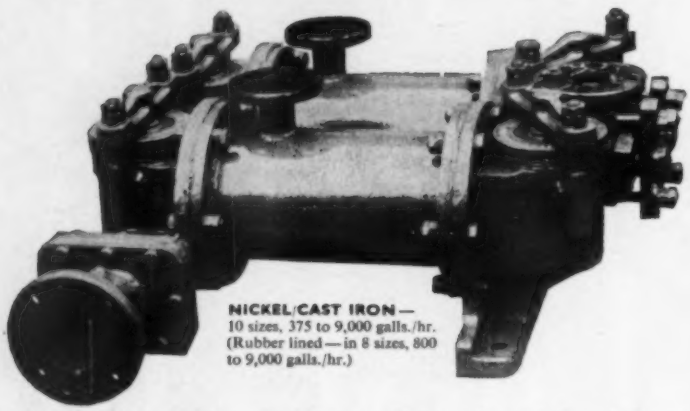

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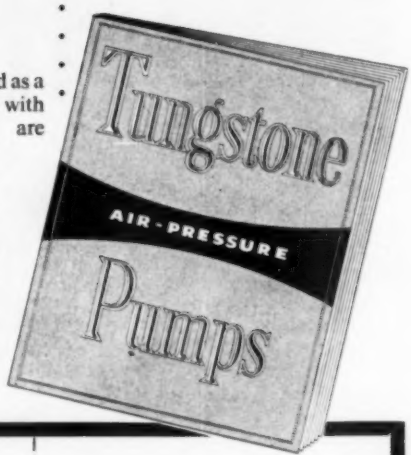
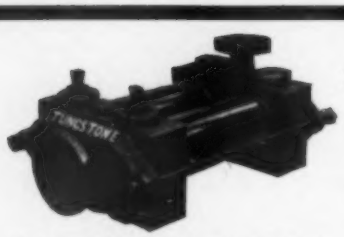
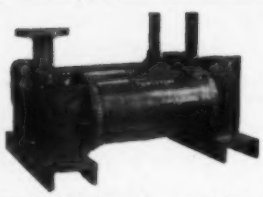
For any given pumping pressure the volume of air going to the pump can be controlled so that the pump's output can be varied from zero to maximum. The pump and whole length of delivery pipe containing valuable liquid can be emptied after each operation at the end of a shift.





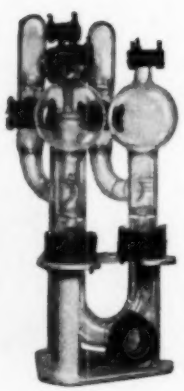
EBONITE PUMP, non-immersion type. Made in 3 sizes: 200, 375, 600 gallons/hour.



LEAD PUMP—immersion type. Made in 8 capacities: 375, 600, 800, 1,200, 1,500, 2,000, 3,000, 3,600 gallons/hour.

non-immersion **LEAD PUMP.** Made in 8 capacities: 375, 600, 800, 1,200, 1,500, 2,000 3,000, 3,600 gallons/hour.

EBONITE PUMP, immersion type. Made in 3 sizes: 200, 375, 600 gallons/hour.



GLASS PUMP—"Pyrex" brand Borosilicate Glass. Made in two capacities: 300 and 800 gallons/hour.

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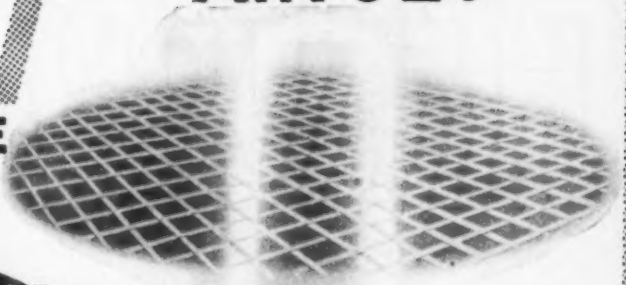

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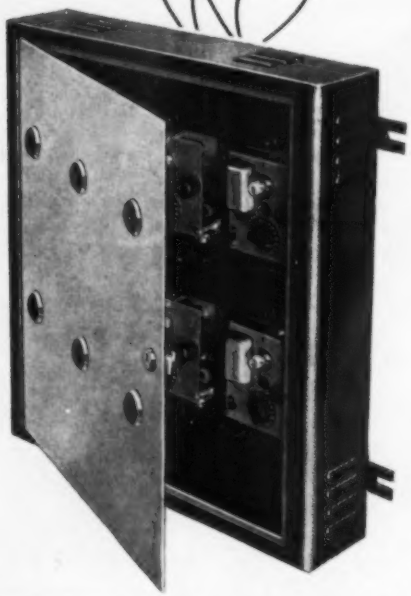

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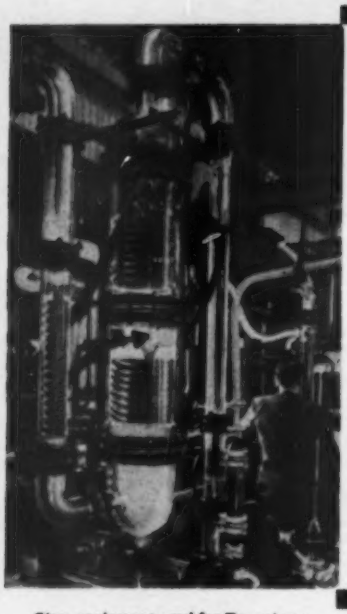
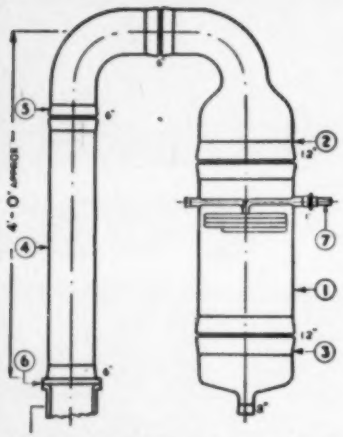


Glass equipment used for Toxaphene production
(Photo by courtesy of Cocker Chemical Co. Ltd.)



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3	12" to 2" Pipe Reducer	PR.12/2	1
4	6" Pipe Section 36" long	PS.6/36	1
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6	6" Glass Spacer ¼" thick	SS.6/¼	1
7	1" Hose Connector (Metal) Complete	MHC.1	3

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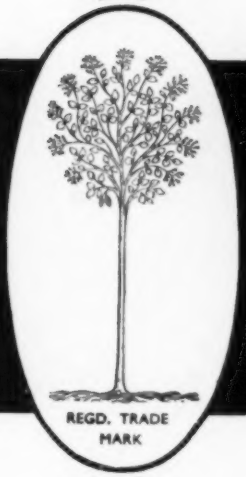

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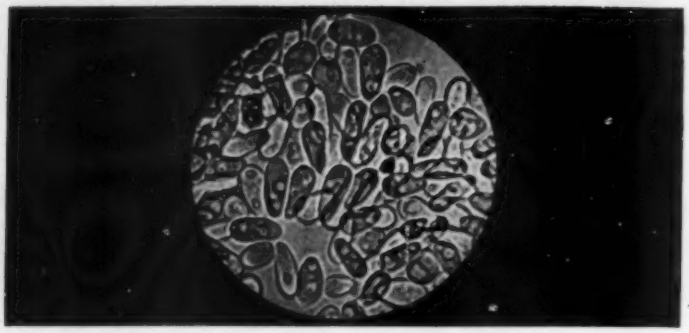

Photomicrograph by the Distillers Company Limited

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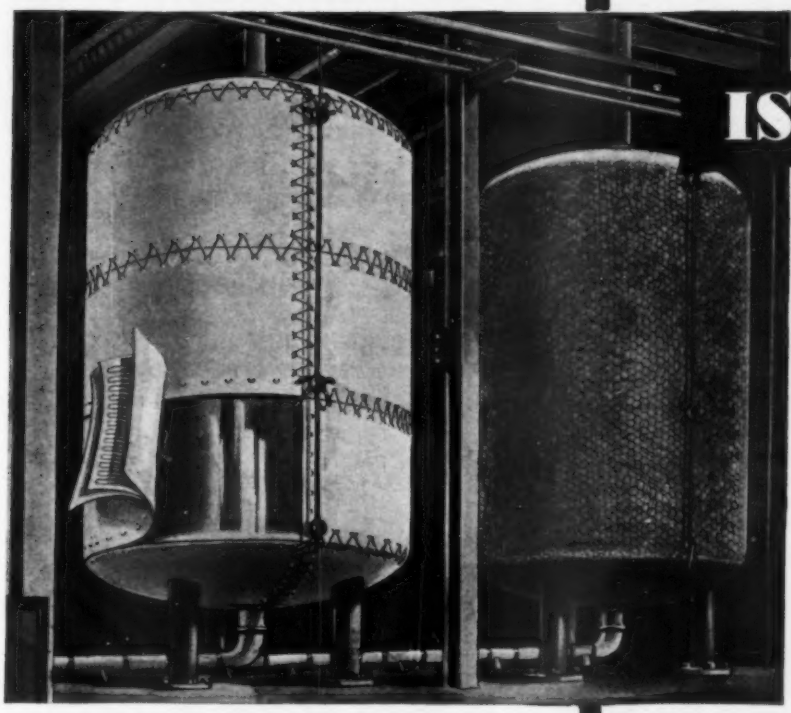

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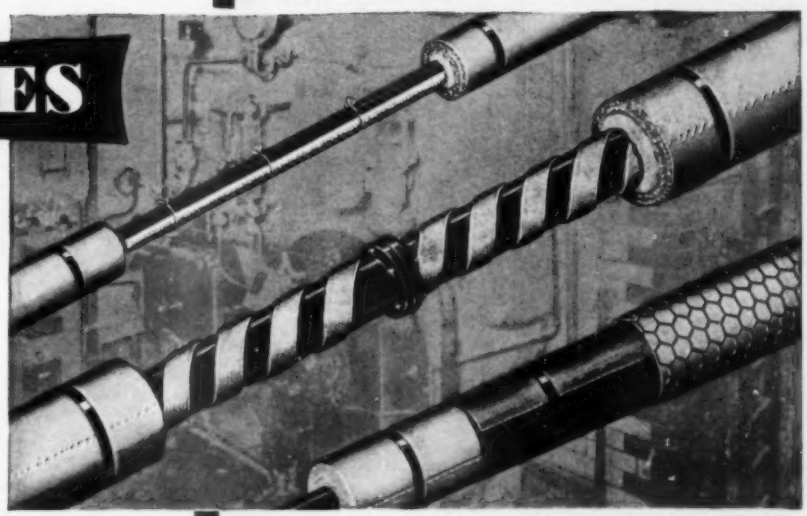

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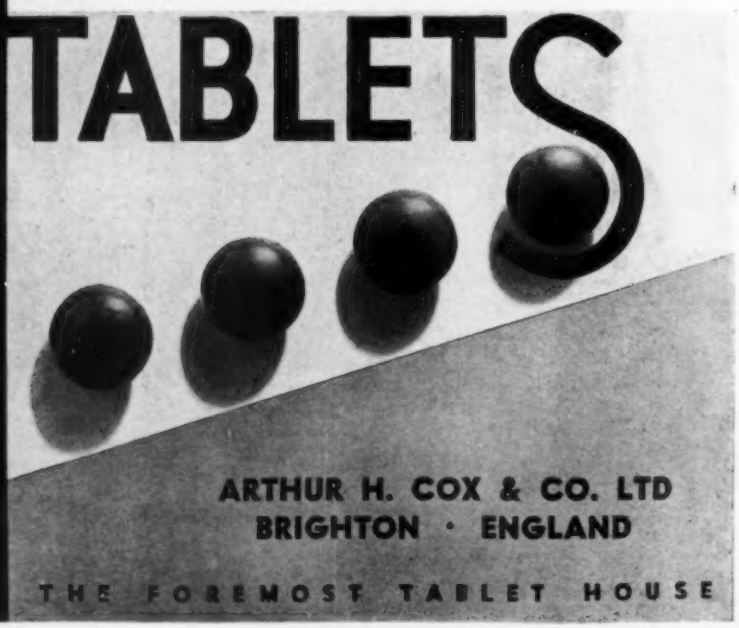

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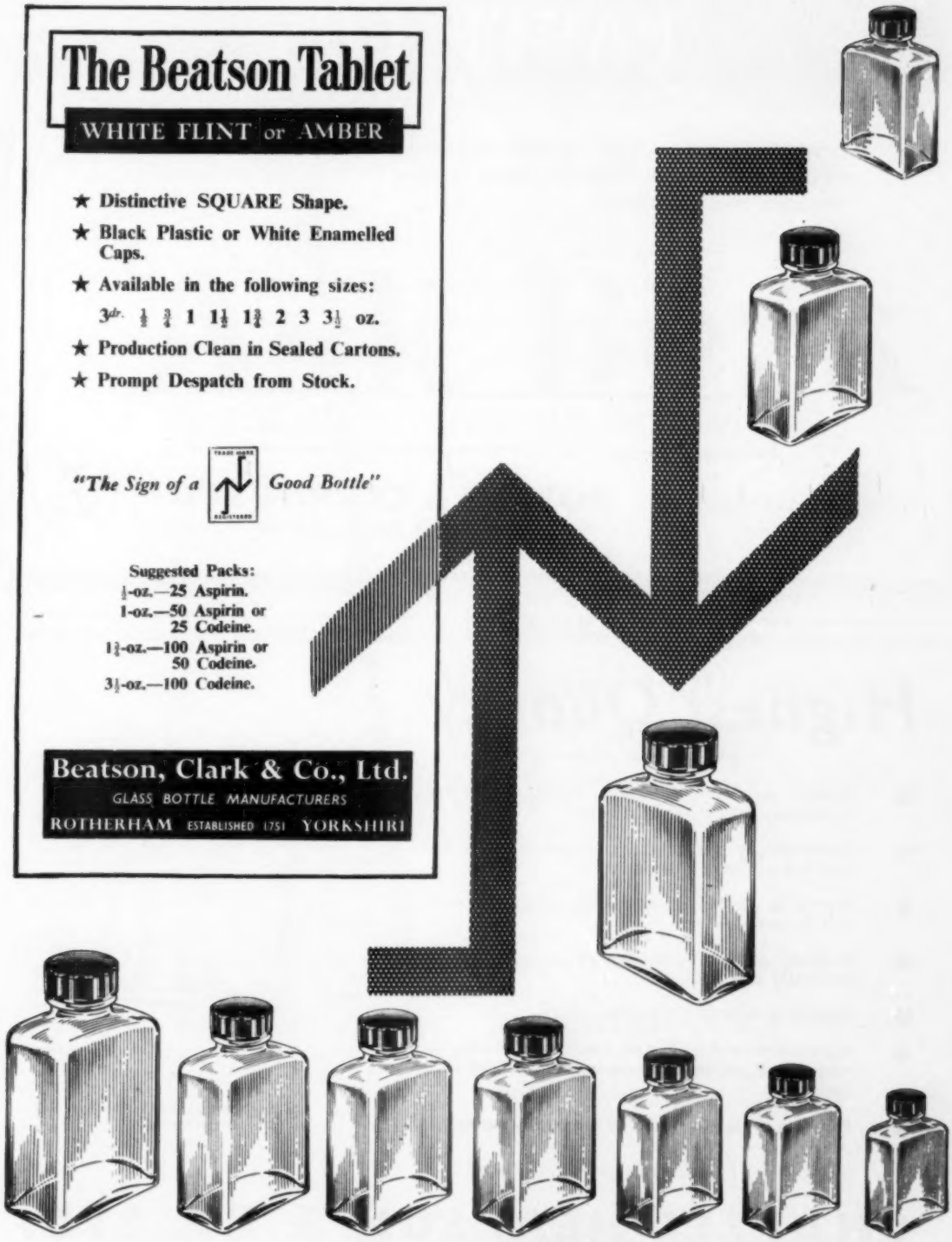

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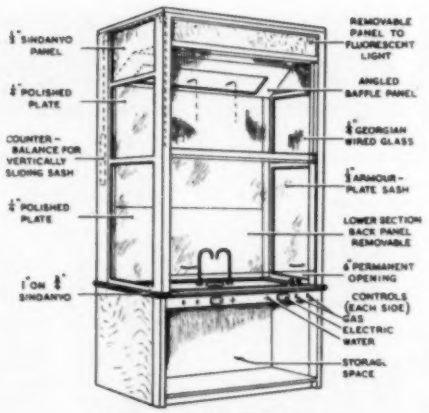

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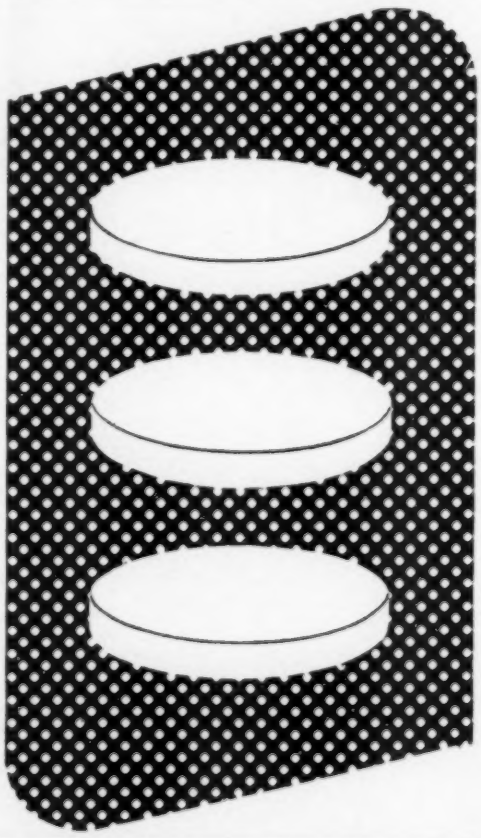

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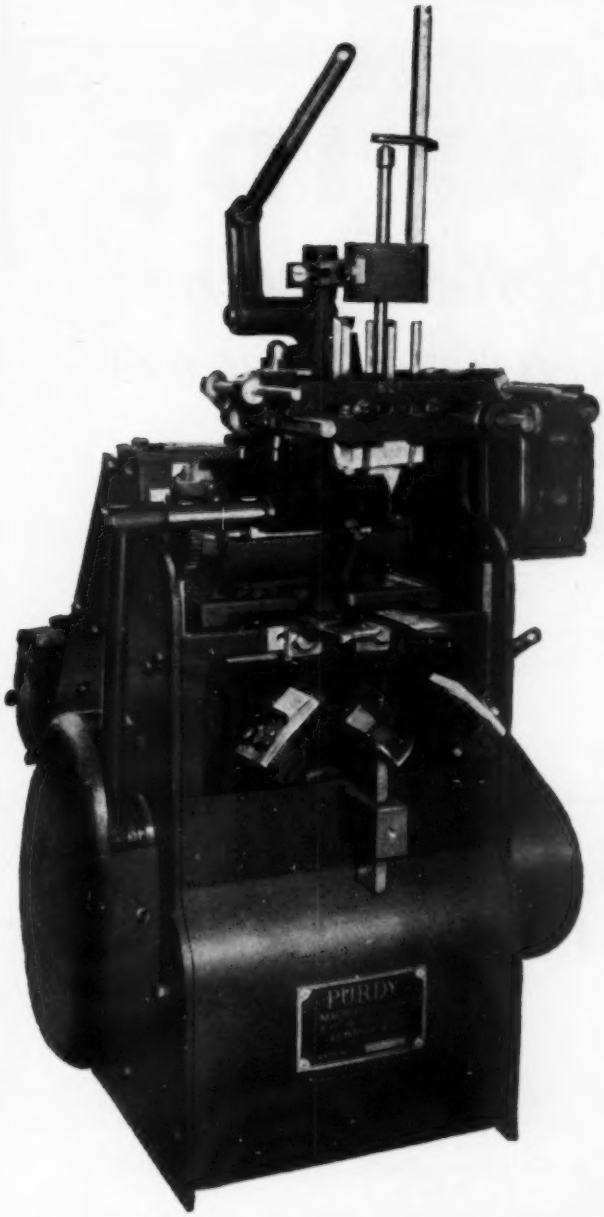

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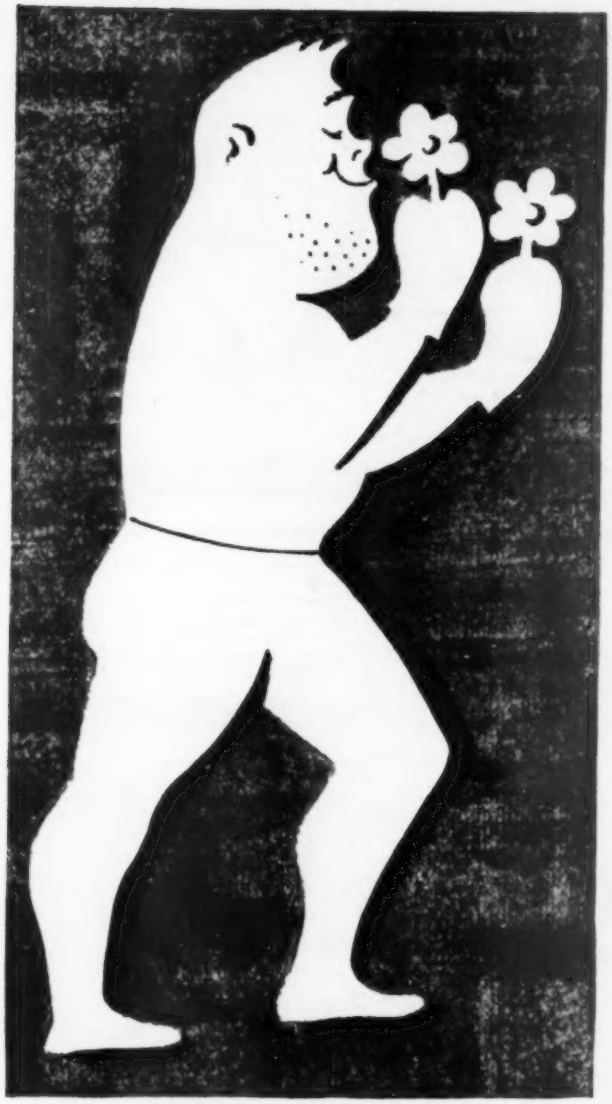

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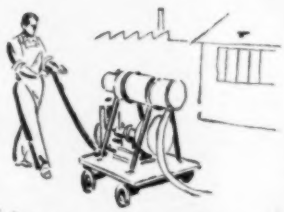

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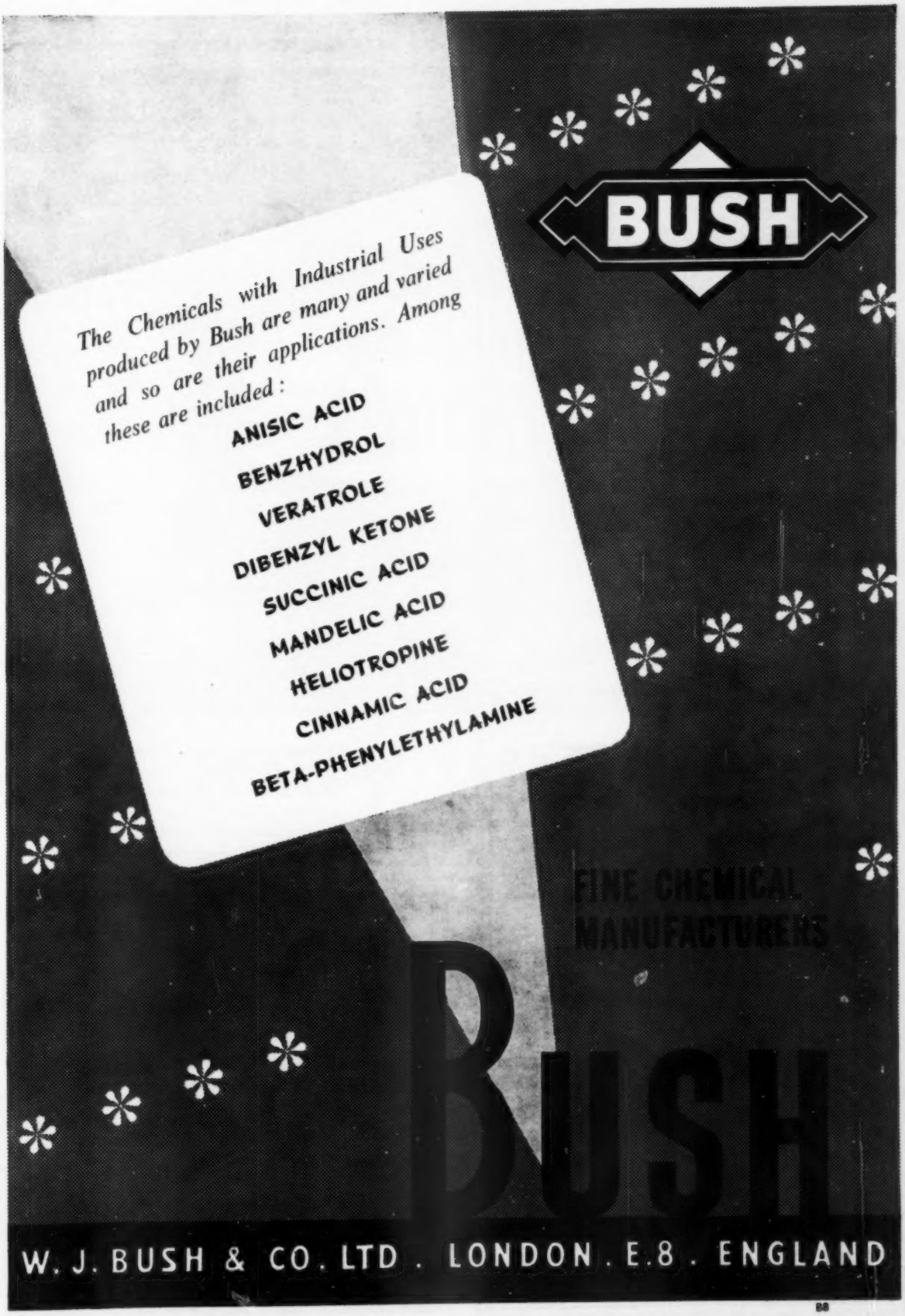
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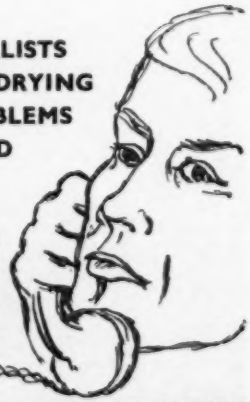

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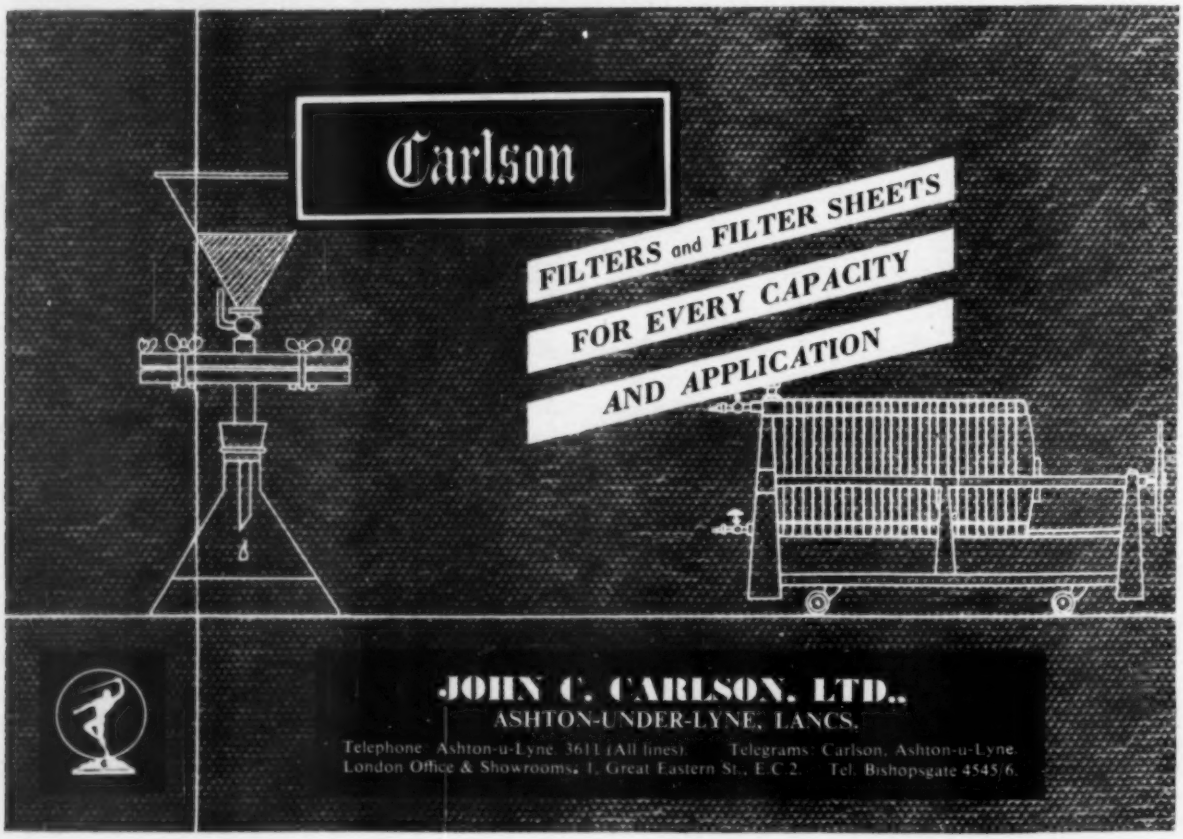
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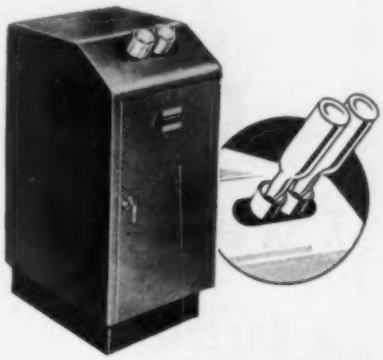

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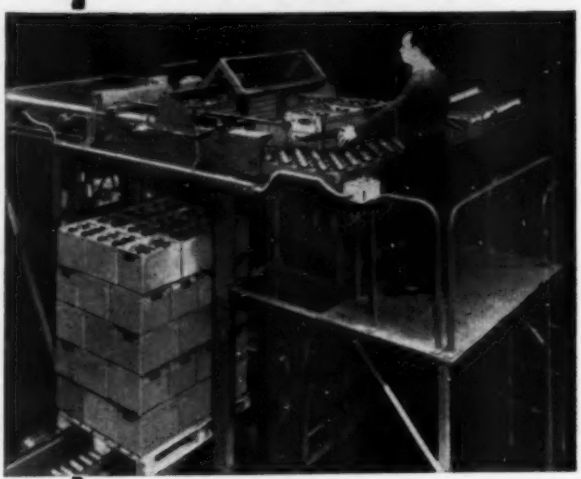

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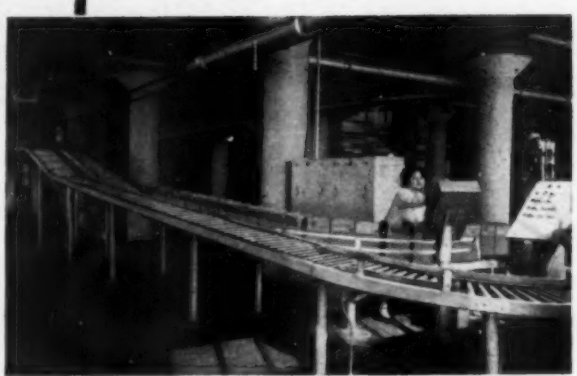

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DCL 'M' TYPE

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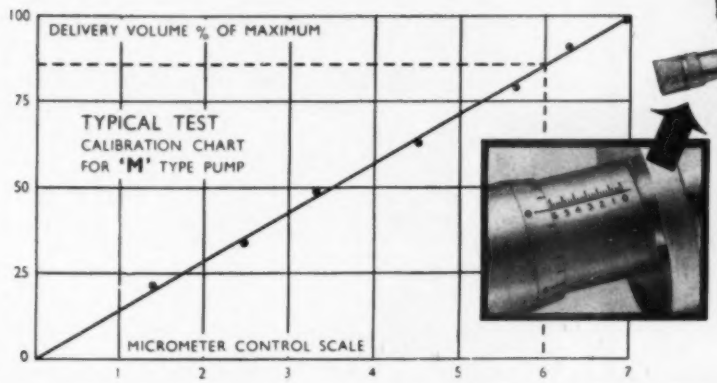

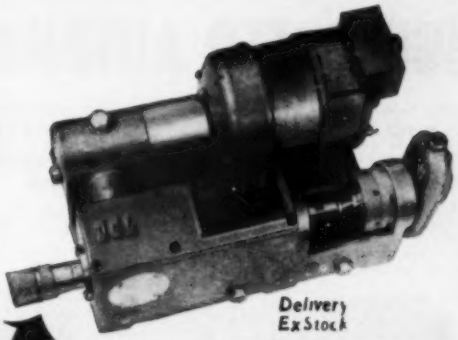

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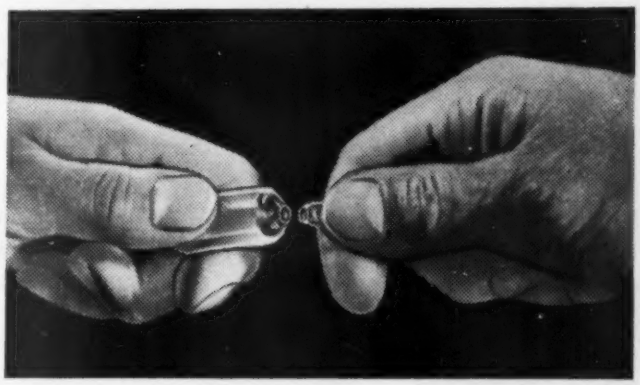

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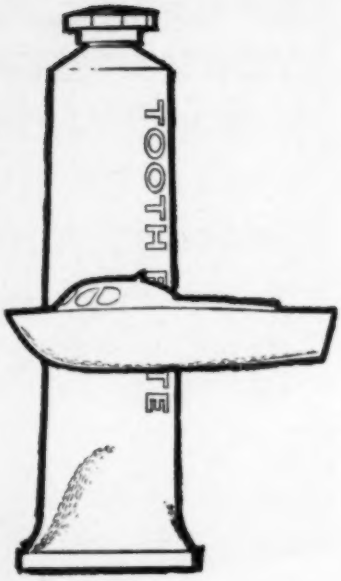

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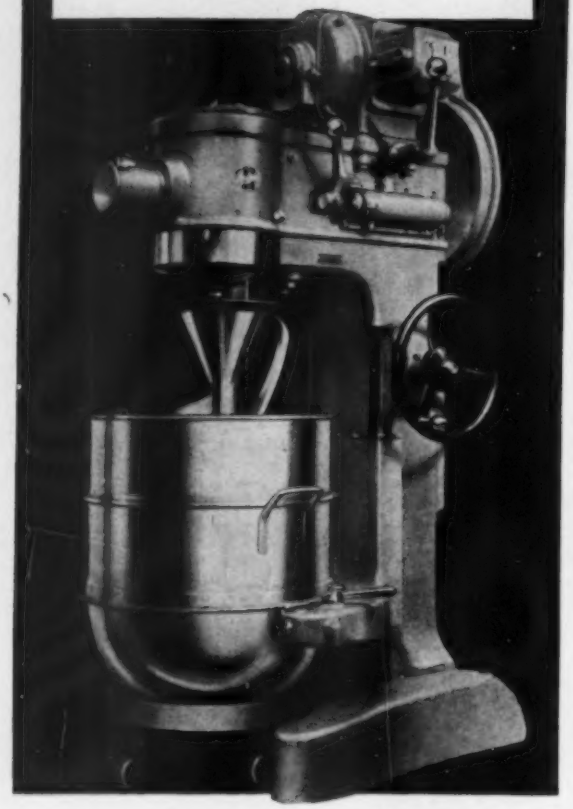

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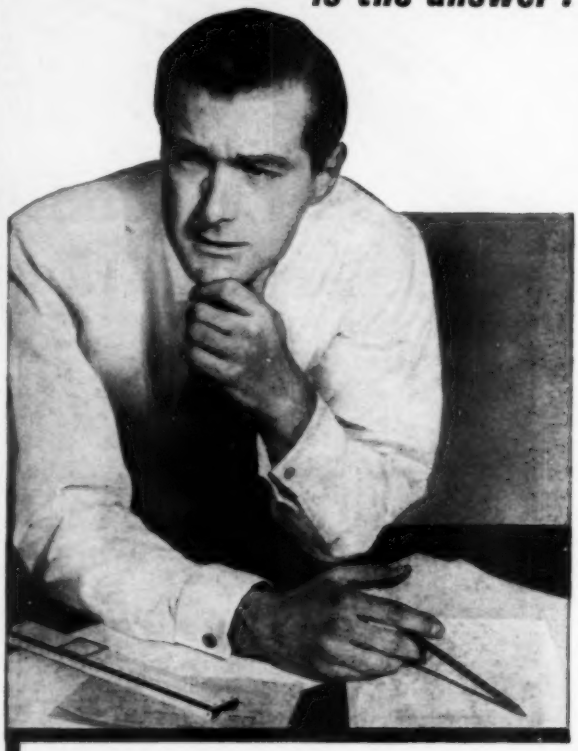

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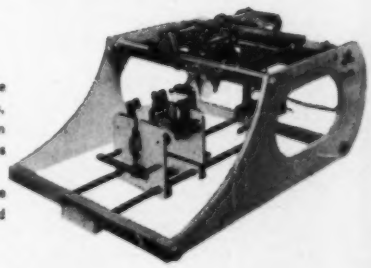

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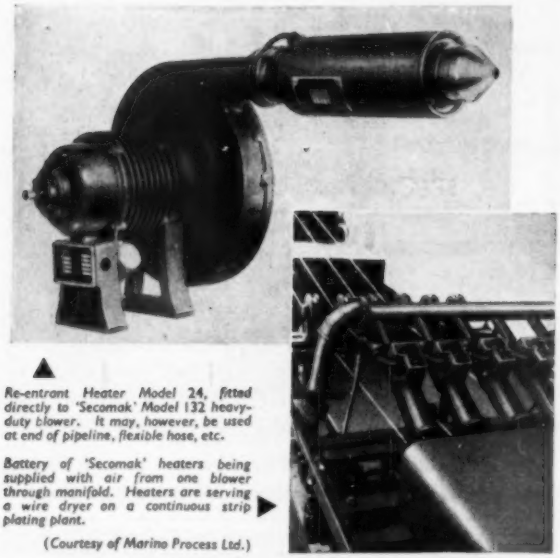

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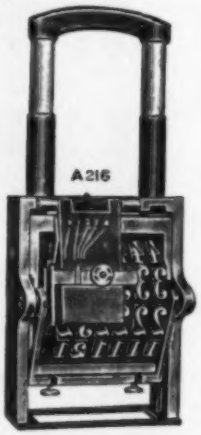

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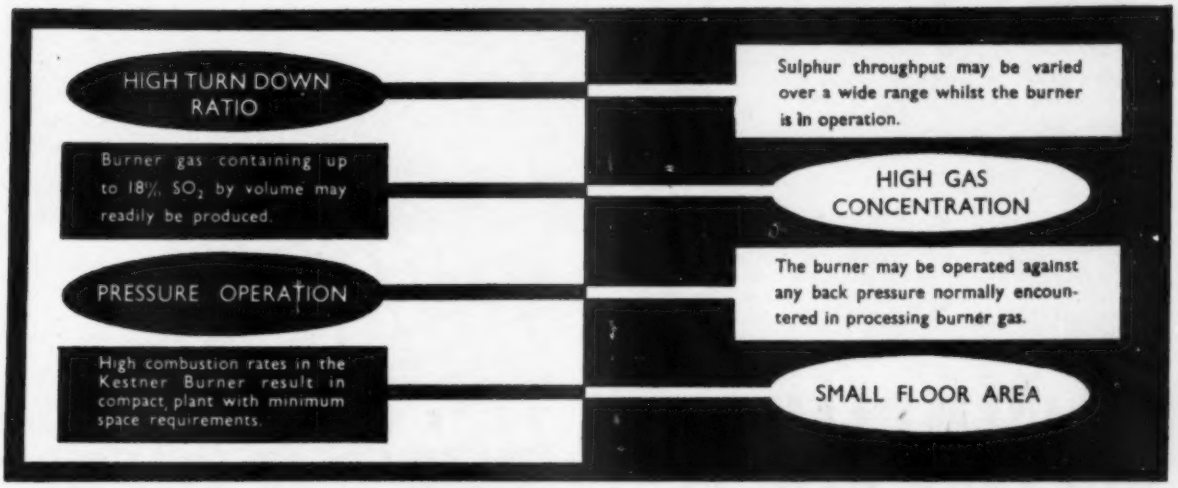
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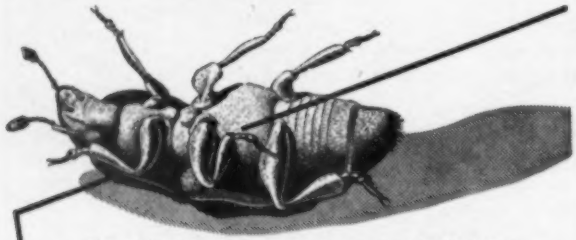

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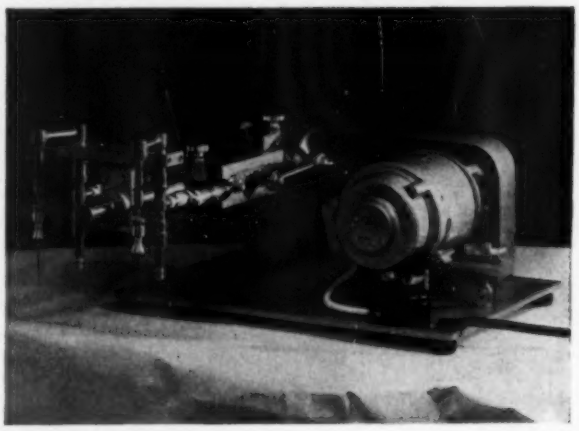

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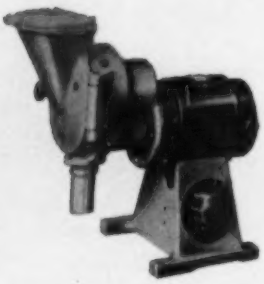

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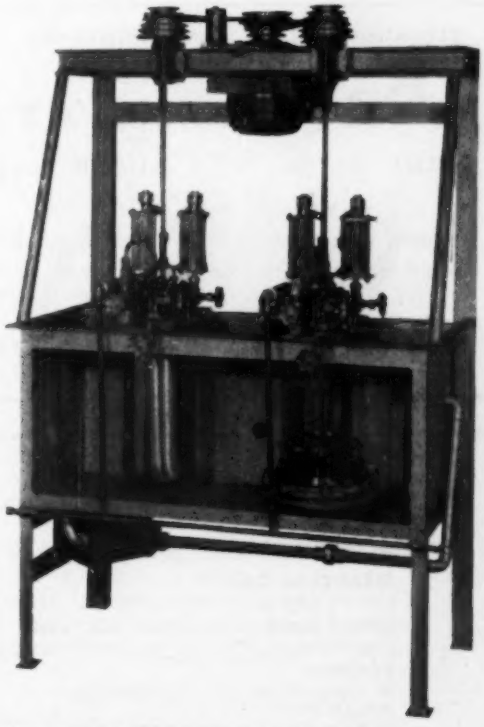

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Ref. A.55

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